

# Suggestive Studies in Education

*(With an Introduction by Pandit Amaranatha Jha, M.A., F.R.S.L.  
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DEBNARAYAN MUKERJEE

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## P R E F A C E

THIS small volume is a kind of pioneer work in the field of Indian education, for it attempts to investigate certain problems in a critical spirit and from the point of view of the Indian teacher. I am not aware of any other book of its kind published in this country.

The papers included in Part I are some sample studies conducted in leisure hours between 1930 and 1942. In a sense they suggest ways along which educational workers, both teachers and experts, can carry on further investigations with the express object of thrashing out important problems and exposing errors, shortcomings and superstitions which abound in all spheres of Indian educational practice.

Each paper is a suggestion, which means that the investigator can do full justice to the subject and to himself only by continuing the study and giving wide publicity to its findings. There is no other method by which Indian education can be saved from the inevitable fate of stagnation and putrefaction.

Part II is a complete monograph, being a slightly amplified reprint of the 1939 publication. It is a pity that examinations are still being practised in the good old way with its errors, rituals and shameless arrogance. India is a funny country, indeed, for it officially permits its educational theory to soar in the speculative atmosphere of the 21st. century, with its educational practice weltering in the confusion of the 18th. It is still to be seen when or how people succeed

in bringing about a real overhauling of the examination system.

Attention is drawn to the two important studies added to para 35. I again press for a most serious consideration of the suggestion made in para 22, viz. abolition of the present system of declaring *passes*, *failures* and *divisions* at the High School stage. This important reform will save everybody a good deal of individual, social and economic loss and automatically switch all effort towards a more wholesome and effective educational reform.

I shall be grateful if sympathetic critics let me know my errors and deficiencies, or otherwise enable me to correct myself. I have mentioned names of those friends who have been associated with me in these studies. In my retirement I can only hope that they are continuing, or will continue, their positive contribution towards the reconstruction of educational ideals and practice so needed in this unfortunate land at the present time. I am particularly grateful to Mr. C. M. Bhatia, M.A., B.Ed., of the Government Training College, Allahabad, for having rendered valuable help in the preparation of the present volume.

64, ALLENGUNJ, ALLAHABAD. }  
*April, 1943.*

D. N. MUKERJEE.



## INTRODUCTION

Mr. Dev Narain Mukerji has been engaged in educational work for a whole generation and anyone who is connected with education in these Provinces knows how keen and thorough his study of educational problems is. During the many years that he was associated with the Teachers' Training Colleges he had a valuable opportunity for investigation, research and examination of educational principles in the light of conditions obtaining in these Provinces. The papers included in the present volume bear eloquent testimony to the thoroughness and independence with which he has carried out his investigations. Some of the conclusions at which he arrives—particularly in regard to examinations—may seem to be alarming. But the subject has been very carefully scrutinised by various institutes and committees in Europe and America and the results reached by them are equally destructive of one's faith in examinations as a reliable means of testing ability. I have no doubt that all those interested in education will read this book with pleasure and profit

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SENATE HOUSE, ALLAHABAD,

*April 27, 1943.*

# CONTENTS

	PAGE.
Preface.	
PART I	... 1—101
I. Measurement in Education	... 1
II. The Message of Indian Schools of To-morrow	... 14
III. A Decade of Education in the U.P.	... 31
IV. A.-V. Education in the U.P.—Tendencies in Expansion	... .. 40
V. Age-distribution in English Schools in the U.P.	... 52
VI. A Study of School Errors	... 69
VII. A Survey of High School Marks	... 80
VIII. Marking of Answers in Arithmetic and Algebra	88
IX. A Study of Scholars' Registers	... 97
 PART II	 ... 1—57
Reform of Examinations	
Introductory	... 1
The Problem	... 10
Technique	... 25
Appendices I and II	... 47



## PART I



## MEASUREMENT IN EDUCATION\*

Being professionally and necessarily a purveyor and distributor of second-hand educational information I have been earning the reputation of a learned teacher for many years, and although honestly dissatisfied with my lot and constantly burning to be actively in a line with my coprofessionals of the west, I had to continue my life in much the same way until the day when an idea struck me with great force while I was lecturing to my class in the Agra Training College on Examinations and Class Promotion. I was talking about a statement of Prof. Burt, in which after pointedly referring to Age, Attainment and Ability as the three essential factors in the examination of pupils he makes the following momentous suggestion :—

“ Even with average children the amount and accuracy of their present knowledge forms but a rough, uncertain index of their power to acquire more knowledge. No matter how homogeneous a class may be at the beginning of a term, by the end of it a few will have forged far ahead of the majority and others lag behind. It is what a child *can learn*, not what he *has learnt*, that should count. The golden maxim should be : promote by attainment rather than by age, and by ability rather than by attainment. In too many schools the order of

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\*From an Address delivered before the New Education Fellowship, Agra, on September 16, 1933.

precedence is inverted. First consideration is always to be accorded to the child's innate intelligence.... Hence in all questions of school organisation, in all questions of class promotion, but above everything, where sub-normal or super-normal pupils are concerned, the teacher, besides examining the child's acquired school knowledge, should also possess some means of gauging his inborn mental capacity."

The fact that struck me at that time was that our schools attend mostly to the attainment of the students (and that, too, by means of an incomplete and time-worn system of examination) and a little to their physical ages (probably because the Educational Code lays emphasis on this consideration), but never to the most important item, viz., their ability. The conclusion that forces itself upon us is that we are not doing full justice to our children. Probably we are doing them positive injustice. This idea certainly begins to gain strength when we recollect another important and relevant finding of educational psychologists. They have discovered that a significant relation exists between the physical and mental ages of children which no educationist can afford to ignore. Recent researches indicate that inborn differences existing between individual children increase in direct proportion to their physical age. For example, a child who is intellectually backward by one year at the age of five will probably be backward by two years at the age of ten, and by three years at the age of fifteen. The importance of this finding can hardly be overemphasised, especially when we see our schools admitting, promoting and detaining children in a most indifferent manner, with the result that, in every class, and

particularly in the middle sections, we always have pupils of all ages, sizes and abilities hopelessly crowded together.

It was this fact that led me to start an investigation on Age-Distribution in our schools. Even a most cursory examination of the figures shows that our present system of classification of school children for purposes of teaching, examination and promotion is not only defective but really absurd ; we are not engaged in giving them the education which is suited to their age or natural requirements.

Sir J. C. Bose once said,

“ Every living organism, in order to maintain its life and growth, must be in free communion with all the forces of the universe around it. Further. it must not only constantly receive stimulus from without, but must also give out something from within. And the healthy life of the organism will depend on these two-fold activities of inflow and outflow...This is equally true of the intellectual life of a nation. When, through narrow conceit, a nation regards itself self-sufficient and cuts itself from the stimulus of the outside world, then intellectual decay must inevitably follow. So far as regards the receptive function. Then there is another function in the intellectual life of a nation, that of spontaneous outflow—that giving out of its life, by which the world is enriched. When the nation has lost this power, when it merely receives but cannot give out, then its healthy life is over and it sinks to a degenerate existence which is purely parasitic.”

Shall I be very wrong if I make bold to suggest that, although we teachers are supposed to be a body of intel-



lectual experts engaged in attending mostly to the intellectual training of the children of the land, we have, generally through our indolence and a lack of ambition and self-respect, degenerated into a body of unintellectual parasites? Have we ever paused to find out if we have been receiving outside influences in a healthy spirit and also giving out of our life's experiences with the object of contributing towards the making of a New Education?

*Basic idea of Educational Measurement:*—The basic idea of measurement in education is that, if our educational procedure brings about any kind of change in the children, this change must be measurable mathematically. Methods and materials of instruction can hardly be worth anything until their effect on the pupils is measurable. It does not matter whether the method of measurement is direct as in Length or Weight, or indirect as in Heat or Electricity; our ideas can be clear, accurate and unambiguous only through mathematical measurement. And the greater the importance of the item to be measured the greater the need for our method of measurement being exact and accurate. The fact is that measurement in education is practically the same as in the physical sciences, the basic ideas being fundamentally alike in both; but the educational scientist never fails to recognise the difference that exists between a quantity like heat and a quantity like reading ability; he knows that while in the former case the factors affecting the experiment can fairly be controlled, in the latter case it is extremely difficult but not impossible to control the factors which influence the measurement. He also knows that educational measurement is not free from errors, but he knows too that such errors are not fundamentally different from those which occur in the physical sciences.

What is most important to remember in this connection is that the basic function of Science is to help us to attain our objectives in the quickest and most economical way and hence its methods might quite profitably be applied, as they have been applied, towards the solution of many an important problem of education.

Two prominent characteristics of the scientific method as applied to education are: (1) the use of objective methods in the study of school children and particularly their behaviour, tastes and interests, in addition to other matters directly connected with class-work; and (2) the use of controlled experiments for determining through comparison of results the value of specific educational procedures. These general characteristics, however, cannot convey any adequate idea of the technical details which must be mastered before measurement can be conducted with facility and directed to useful ends. As it is impossible to deal with the technical aspects of the subject along with their full implications in a limited space, I shall simply indicate a few of the more important applications of the principles of measurement to school problems.

*Classification of Scholars:*—I have already pointed out how our present system of classification is extremely defective on an age-basis. If we had an adequate instrument of mental measurement we would certainly find a worse state of affairs. It is needless to mention the fact that a teacher requires a most intimate and correct knowledge of a pupil in order to determine what methods and materials to employ for his training. But it is not enough to find out what ability or abilities a particular child possesses; we must know in what amount they exist in him, and the more exactly we know this amount the better. The idea under-

lying the classification of children is that they are a homogeneous group and hence are expected to progress in the class with a uniform speed. But are we sure we are at present able, with the means at our command, to classify the students in this way? Do we know how to discover children having equal intelligence? Can we put together children who will progress at an equal rate? Here is the need for learning from proper sources the technique of framing and properly using Intelligence Tests, so that the basis of all educational activity can be discovered in a relative manner, for it is idle to attempt building anything out of a child without knowing the stuff of which he is made,—his inherent mental capacity.

My Age Distribution Chart shows that the percentage of higher-age pupils is far greater than that of the under-age ones. Here is an important problem which needs careful investigation. Is this state of affairs a natural one, or brought about by causes which are harmful to the fundamental interests of the children?

*Diagnosis for Teaching Purposes:*—Our teachers are satisfied with the present practice of mass instruction. They have become accustomed to teaching whole classes in the customary way and to the usual percentage of passes and failures in the annual examinations. They assume that some good and some weak pupils will always exist in every class and hence they do not find anything requiring attention within the current system. But, do they do anything for the large number of failures detained in every class? Do they, on the other hand, ever pause to consider that the bright pupils at the other end of the scale also require attention and special treatment? I doubt if any single school has ever modified its practice in favour of the super-

normal children or taken to heart the oft-repeated warning that the genius of the race is being retarded in our schools

Teaching will continue to be a ritual, a superstition, or a dodge until our teachers learn the method of measuring the abilities and capacities of their pupils, and not only capacity in general but also capacities in particular, *e.g.*, capacity to learn a particular subject, capacity to progress in all aspects of the subject, capacity to manage different subjects on the same day, and so on. Their weaknesses have also to be understood fully and corrective measures applied if teaching is to mean anything. Our present method of diagnosing all these and other similar cases is extremely crude and vague, while about educational diagnosis for the purpose of vocational guidance or discovering special abilities and aptitudes, the less said in this country the better.

*Measurement of the Efficiency of Instruction:*—I said just now that teaching can easily be compared to a ritual or a superstition or a dodge. These three words, borrowed from a recent book by Rusk on 'Research in Education,' represent with a good deal of accuracy the three classes into which our present system of teaching can be placed. No school is found keeping a clear and worthy aim in view; no organisation or method discloses clearly that it aims at definite purposes, like creating particular habits at different stages or developing particular abilities. Mass instruction is conducted like random scattering of seeds on unprepared soil, and the result is the same in the two cases. Sometimes I have wondered if a class of pupils would show the same, if not better, result in tests, if our present system of teach-

ing were completely withdrawn and children in the class left mostly to themselves. In such a case boys would probably do better through their own initiative and effort than if they were dragged by their teachers along lines which are vague, irritating and almost purposeless to them

In any case, it is better that some measures were adopted to save teachers from this sort of criticism, and this object can be achieved by having a clear standard of initial and final achievement for each class. If our class system means anything it is that each class begins its work from a definite standard, and, after one year of work, is expected to attain a certain standard, and the difference between the two standards of achievement forms a good index of the teachers' efficiency. If we could devise and use standardised tests in the various fundamental subjects with the object of preparing a standard scale for measuring the pupils' achievement in a particular area, and if the scale were prepared properly, we should then have a sort of foot-rule with which to compare the efficiency of instruction in a particular school or in a particular subject or subjects. This method of setting up a standard for a particular area for the purpose of comparison and guidance appears to be one of the best methods of educational measurement being impersonal and objective in the strictest sense of the terms.

*Measurement of Waste in Education:*—I do not know if our attention has ever been drawn pointedly to the tremendous waste of time, energy and money daily occurring inside our educational system. This waste is extravagantly caused by that wretched form of repetition so fondly practised by our teachers under the name of revision. It is a

common sight in schools to find children engaged in revision from the month of January, which to me means that the course is either too meagre for one year or has been perfunctorily done in the class. In any case, if there is any waste here, it can and should be measured and the result of measurement applied towards the reform of the blind system current at the present time.

Other examples of waste are: overlapping of subject-matter, the same topic being taught as a new one in different subjects to the same class, which shows that the head of the institution does not take care to bring about a coordination in the work of different teachers; teaching the whole class according to the capacity and pace of the average pupils, thereby compelling the best ones to mark time and thus feel dissatisfaction and not infrequently a positive distaste for the subject and dislike for the teaching; the large number of failures in each class, whose time and energy are not treated with proper respect and consideration. Another waste is caused by a repetition of errors year after year by the pupils in spite of repeated correction. The number of instances where our blindness is producing a large amount of waste can easily be multiplied; I have simply pointed out a few of the more glaring instances which, through proper measurement can bring home to our teachers and headmasters the need for adopting a more sensible outlook towards the work that they are expected to perform.

I must also mention that another kind of wastage, which is a terrible national loss and which must be made a subject of study, lies concealed in those bound volumes which are kept as permanent records in the office of headmasters

and which are called "Scholars' Registers" A most simple study will furnish interesting answers to such important educational questions as "How many students complete their schooling in the same school?," "How many years does a student take to complete the present eight years' School Course from Class III to Class X?," "At what stage is the stagnation most pronounced, and why?," and so on. I am sure that the evils of stagnation due to careless schooling at particular stages as well as the evils of migration from school to school will be effectively exposed through a study of these registers, and the ultimate result will be a wholesome revision of the Educational Code, and a greater respect for schools.

*Statistical Methods*:—There are already in every school masses of figures accumulated in various connections which can be made the basis of much useful work. The marks awarded in the various tests and examinations, with the help of statistical methods, can easily be worked upon to establish scales in the various subjects and for the various classes for a number of years, and, after due comparison, the school can prepare a standard scale of achievement for each term, for each class and for each subject. At present the utility of these marks seems to end when they have been posted in the marks register or copied on the Progress Report Cards. The figures for attendance, the figures for absentees, the number of books issued from the library to students and to teachers, the figures for attendance on the play-ground, the height, weight and chest measurements of students (community-wise) from year to year, the amounts of fine imposed on students for various offences, the number of periods allotted to the different subjects, and a host of other

numerical figures can easily be subjected to the scrutiny of statistical methods and I am sure the results will go a long way towards making our educational practice less capricious and more sensible and useful.

*Technique of Educational Measurement:*—The fact is that we have never been told the value of measurement along the lines suggested above or trained in the technique which can enable us to conduct measurement with purpose and accuracy. I may also point out that, while it is not difficult to learn from the many excellent and easily available books on the subject the methods of measurement, it is a much more difficult task to *interpret* the results in terms of their practical application. It is absolutely necessary for the investigator to be able to arrange the data in a frequency table, calculate Means and Standard Deviations (with their Probable Errors) and also Correlations, understand the full significance of such terms as Intelligence Quotients, Educational Quotients, Norms etc., and also work upon Research methods along approved lines, arriving ultimately at numerical figures which are mathematically accurate. The main difficulty will arise when the numerical results have to be correctly interpreted from the educationists' point of view for the purpose of practical application. The real object of educational measurement is not to furnish amusement to the teacher or to gratify an idle curiosity, but to supply definite handles to the teacher for managing his life's business. This brings us the need for remembering the difference between "pure research" and "practical research" which is explained by Charters in the following words:

"Pure research has only two steps First, a problem may be selected from any source, and secondly a



scholarly and careful solution must be found. In practical research there are five steps. (1) A going concern is studied, measurements made and points of weakness discovered. (2) Some one of these weaknesses is selected for investigation. (3) Then follows solution in the laboratory. (4) This is succeeded by the step of installation, in which modifications must be made so that the solution will work in practice. (5) Finally, the solution must be maintained by placing it in the organisation so that it will become a permanent part of the system. The pure research worker must, upon entering the practical research field, never lay the blame for the lack of use of his solution upon the organisation. It is absolutely essential that he considers the failure to use it to be a failure in his solution, and he must seek to make the necessary changes and set up the proper routine to secure its permanent use." (Quoted in Rusk: Research in Education, p. 29).

Here is a practical hint for the educational investigator. It is with a knowledge of the technique of measurement coupled with a strong common sense, a clear outlook and a correct perception of educational purposes, that he can make his contribution towards the reform of education.

It is towards this new but noble end that I wish to draw the attention and energies of our teachers. They are engaged in a living and vital activity; let them show that they have not lost either of the two characteristics of a living organism described by Sir J. C. Bose and quoted earlier in this paper. And, above all, let them forget that, in an age when education is rapidly evolving into an exact

and positive science, teachers at least cannot afford to be ignorant of the methods of science and thus encourage the prevalent idea that any educated person can be a school-master. Training in those technical methods which belong to Education as a Science is an absolute necessity, and our teachers will be able to make education a real profession in proportion to their ability in dispensing their technical knowledge for the lasting good of the children of the land, and thus establish a real claim on public consideration like medicine, engineering and other professions.

## II

### THE MESSAGE OF INDIAN SCHOOLS OF TOMORROW\* (*An Interpretation of the New Schools of India*)

The time has probably arrived for writing a new chapter on the history of modern education in India. It is unfortunate that the evolution of special schools all over the vast continent has not yet been sufficiently noticed in the Government Educational Reports, although the Calcutta University Commission of 1917-18 made a beginning in this respect by mentioning two special schools which they visited in Bengal. But since then hardly any Government Report has attempted to do even the barest justice to the extra-traditional forms of educational institutions which have been and are still growing, both in number as well as in importance, almost in every corner of this country.

The memorable Report of the Fraser Commission published in 1920 appears to have been the first systematic attempt to study in a fairly scientific spirit the problem of rural education in India, although it was conducted definitely from the view-point of Christian Missionary bodies. One blessed result of the enquiries of this Commission has been the steady publication of educational literature of a distinctly historical nature "Village Schools in India," "Schools with a Message in India," and "Fourteen Experiments in Rural Education," are some of the volumes which illustrate the experiments that are being conducted by various Missionary bodies throughout the length and

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\* Read before the All-Asia Educational Conference, Benares, December, 1930.

breadth of the country, some of them based on the Project Method, some concerned with village uplift, with others definitely trying the reclamation of criminals through adult education. It would be superfluous on my part to express appreciation and gratitude for what Christian Missionaries have done for the spread of English education in India. Their insight and practical experience, their sacrifice and devotion, their freedom and resources, have all combined to enable them to achieve marvels and maintain success in the whole field of Indian education during the last century and a half. It is no wonder, therefore, to find them setting definite examples in experimental education and, being businesslike in their procedure, publishing records of their methods and achievements which are informative and inspiring at the same time.

I believe that, although the large number of missionary schools all over the country have been brought into existence and are being maintained in a state of efficiency with the special object of propagating the Christian Faith among their students, they have yet been compelled to find room for the liberalising influence of modern world movements in Education, like all other living and breathing educational institutions in all parts of the world. And it is this world-wide influence of irresistible forces, mostly set free in the educational laboratories of Europe and America, through the efforts primarily of Dewey and Montessori, that has started affecting the mind of the educationist and the administrator alike in almost every progressive country in the world, and has, consciously or unconsciously, led to the germination of new types of educational institutions in various parts of India, too. For, 'thought once awakened cannot again slumber' and

the process of evolution is impossible to resist or defy in any sphere of human life.

The names of Shanti-Niketan and Gurukula are well known almost all over the world. I do not propose here to describe in detail the working of these institutions, as my real purpose is to take a brief notice of the spirit which brought about their existence and try to interpret the tendencies which seem to be at work at the present time influencing the minds of educationists and compelling them to attempt important modifications in the aims and methods of the educational system in vogue across the length and breadth of the country.

*The Shanti-Niketan*.—It is impossible to find a better and more inspiring introduction to a study of the system at work in Tagore's schools at Bolpur than the words of the poet himself :

"From questions that have often been put to me I have come to feel that the public claims an apology from the poet for having founded a school, as I in my rashness have done.....

"I suppose this poet's answer would be, that when he brought together a few boys, one sunny day in winter, among the warm shadows of the *sal* trees, strong, straight and tall, with branches of dignified moderation, he started to write a poem in a medium not of words.....

"In these self-conscious days of psycho-analysis clever minds have discovered the secret spring of poetry in some obscure stratum of repressed freedom, in some constant fretfulness of thwarted self-realisation. Evidently in this case they were right.

The phantom of my long ago boyhood *did* come to haunt the ruined opportunities of its early beginning; it sought to live in the lives of other boys, to build up its missing paradise, as only children can do with ingredients which may not have any orthodox material, prescribed measure, or standard value.....

"I tried my best to develop in the children of my school the freshness of their feeling for Nature, a sensitiveness of soul in their relationship with their human surroundings, with the help of literature, festive ceremonials and also the religious teaching which enjoins us to come to the nearer presence of the world through the soul, thus to gain it more than can be measured,—like gaining an instrument, not merely by having it, but by producing music upon it. I prepared for my children a real home-coming into this world. Among other subjects learnt in the open air under the shade of trees they had their music and picture-making; they had their dramatic performances,—activities that were the expressions of life.....

"Children have their active sub-conscious mind which, like the tree, has the power to gather its food from the surrounding atmosphere. For them the atmosphere is a great deal more important than rules and methods, building appliances, class teachings and text books.....

"The first important lesson for children in such an atmosphere would be that of improvisation, the constant imposition of the ready-made having been banished therefrom in order to give constant

occasions to explore one's capacity through surprises of achievement. I must make it plain that this means a lesson not in simple life, but in creative life. For life may grow complex, and yet, if there is a living personality in its centre, it will still have the unity of creation, it will carry its own weight in perfect grace, and will not be a mere addition to the number of facts that only goes to swell a crowd....."

*Visva-Bharati Bulletin No. 9.*

I could not help quoting Tagore at length for otherwise it would not have been possible for me to show that some of the latest ideas in educational philosophy were there in the mind of the poet when he was composing his school poem years and years ago. The principle of natural evolution has been faithfully adhered to, with the result that, along with the growth of public confidence and world-wide recognition, the poem of Shanti-Niketan has been steadily evolving into the epic of Visva-Bharati, with its successive cantos, the Shanti-Niketan, with its school, college and research departments, the Shishu-Bibhaga or Infants' Section, the Nari-Bhavana or Girls' Department, the Sri-Niketan or the Institute of Rural Reconstruction, the Kala-Bhavana or the Arts College. Of these, the Sri-Niketan deserves special mention, as it is a living example of the method by which the future life of the Indian Village can be made really worth living. The poet has himself said

"Today, for various reasons, villages are fatally neglected. They are fast degenerating into serfdom compelled to offer to the ungrateful towns cheerless and unintelligent labour for work carried on in an

unhealthy and impoverished environment. The object of Sri-Niketan is to bring back life in its completeness into the villages, making them self-reliant and self-respectful, acquainted with the cultural tradition of their own country, and competent to make an efficient use of the modern resources for the improvement of their physical, intellectual and economic condition."

*Visva-Bharati Bulletin No. 11.*

Here is a comprehensive scheme of co-educational institutions working for the last thirty years and showing rapid development especially during the last ten years, based on an unbounded faith in nature's own process of evolution and steadily aiming at, and heading towards, a synthesis which may ultimately prove to be a wonderful solution of many of the problems of modern India. Again, in the words of the poet

"The ideal we have for our institution is that it should be a perpetual creation by the co-operative enthusiasm of teachers and students, growing with the growth of their soul; a world in itself, self-sustaining, independent, rich with ever-renewing life, radiating life across space and time, attracting and maintaining round it a planetary system of dependent bodies. Its aim lies in imparting life-breath to the complete man, who is intellectual as well as economic, bound by social bonds, but aspiring towards spiritual freedom and final perfection."

*The Gurukula:*—It is almost impossible in a brief space to do justice to the great idea which the name Gurukula



aspires to stand for. Moreover, there is the limitation imposed by a foreign language in which the philosophical terminology has quite a different basis from what we have in Indian philosophy. For example, the word *Brahmacharya* has been interpreted, in Gurukula language, as *continence*, which, for all practical purposes, may be satisfactory but which cannot, by any stretch of imagination, be said to include the concept of *Brahma* appearing in the original Sanskrit word

It was established "with the avowed aim of reviving the ancient institution of *Brahmacharya*, of rejuvenating and resuscitating ancient Indian Philosophy and Literature, conducting researches into the antiquities of India, of building up a Hindi literature, of producing teachers of the Vedic religion and good citizens, possessed of a culture compounded of the loftiest elements of the two civilisations which have made their home in this ancient land of sages and seers, and of retaining in a permanent form, for the use of humanity, the perennial features of the vitalizing civilisation of the ancient Aryans by moulding and shaping its institutions to suit the altered environments of the times."

*The Gurukula, through European Eyes.*

Here is an institution founded and maintained with the distinct object of creating types of Indians on the ancient Aryan model, and it must be judged accordingly. During the thirty years of its existence it has developed into a comprehensive University scheme and sent out scholars and preachers even outside India. "Indian patriots have pronounced it as a unique illustration of self-reliance of higher

Indian manhood. Mohammedan leaders have held it up as an ideal for Mohammedans to follow and reduplicate .... " Professor Paul of Paris and Principal Sydney Webb of London "have pointed out the Gurukula as an Indian College to imitate and follow." Lord Ishington and Mr. Ramsay MacDonald "have both gone away profoundly impressed." Sir James (now Lord) Meston has spoken of it in the following terms :

"Here we have a band of ascetics devoted to their duty and working in the wilderness following the traditions of the Ancient Rishis combined with the most modern scientific methods and working practically for nothing, and a set of students of strong physique and obedient, loyal, faithful and devoted, extraordinarily happy and extraordinarily well."

"The living contact between the teachers and the taught and splendid health of the *Brahmacharis* were two features of the institution which 'appealed with peculiar force to Her Excellency Lady Chelmsford' when she, with the Viceroy, visited the Gurukula in October 1916. Of appreciations there have been many at the hands of all types of European visitors, some of whom have spent months in the busy and businesslike atmosphere of this unique seat of culture. But the real problem seems to be to find, as some people think it is necessary to find, a system of compromise between the Ancient and the Modern methods, although it is doubtful if such a compromise would be sound in principle. It is clearly mentioned in the Prospectus of the Gurukula University that

"Under the present circumstances of our country a seat of learning that aspires to become a centre of Aryan (Hindu) culture and to give the first place to any methods of juvenile training must perforce forego official recognition ; for you cannot dovetail into an occidental system which is based upon entirely different and in some respects opposite principles and which was the product of an evolution which took place amidst different environments and surroundings evoked by the genius of a different civilisation."

I need not go into these and other questions of controversy on cultural and philosophical matters. To a student of Indian education the system followed at the Gurukula University has to be judged by the quality of its products and the success which they have achieved in their lives. Thus judged the institution has not only not failed in its purpose, but on the other hand, has definitely succeeded in placing before the world probably on a much more effective and comprehensive scale than the Jesuit system of education, an ideal and a method which are creating a far better type of manhood than would be possible under a less vital and less intensely spiritual system. If as Dr. Radhakrishnan said at Oxford in 1926 "Hinduism is a movement, not a position ; a process not a result ; a growing tradition, not fixed revelation .....and will be found equal to any emergency that the future may throw up, whether on the field of thought or of history," then the cultural vitality of the teeming millions of India will, in the natural course, continue to produce institutions like the Gurukula to fulfil their life's needs at the required moments.

*The Ramakrishna Mission.* That this belief is correct is shown by the educational institutions which have been growing within the folds, and under the direct influence, of the Ramakrishna Mission. This monastic order, as is well-known, stands for Vedanta as the universal faith and has consistently demonstrated some aspects of the practical side of their philosophy, particularly in the field of social service. But few people have yet tried to understand the fact that Swami Vivekananda's spiritual insight never allowed education to be left out from his schemes of service. As early as 1902 Miss Margaret Noble, a schoolmistress of Wimbledon and founder of the Sesame Club, London, who joined the Ramakrishna Mission as the Sister Nivedita, started a school for girls in Calcutta and has left us considerable educational literature written under the influence of Vedanta on the one hand and of the needs of the time on the other. Since then various types of schools and Students' Homes have been growing up under the auspices of the Mission in various parts of the country.

The Sister Nivedita Girls' School at Calcutta, imparts "that kind of education to the Hindu Girls, which would make them loyal to the ideals of the race and fill them with a passion for Seva, an education which would be truly national in type, practical and industrial to a certain extent according to necessity, and productive of strong character and self-determination on the part of the educated by combining the modern Western methods with what are purely Indian. While leaving undisturbed the place and influence of the woman in Hindu society and keeping intact her tenderness and humility, great power

of service and silent self-effacement which go to make her the centre of the Hindu home, the school has been endeavouring for the last two decades to make her more efficient in the household duties and the arts and crafts auxiliary to them."

This ideal, I am sorry to note, is not generally kept in view in preparing schemes of female education in India.

But the one institution which stands out as the largest and one of the best-conducted schools managed by the Mission, is the Ramakrishna Mission Students' Home at Madras. Early in 1905 'the harrowing tales of suffering of four boys led Swami Ramkrishnananda, the President of the Madras Centre of the Mission, to found a Students' Home in a small rented building'. At the end of the year 1927 the Home had grown into a big institution, having not only students reading in the different colleges of Madras, but also a residential High School and an Industrial School of its own, with a library of 5,000 volumes, and a medical ward, standing on over seven acres of land. The capital investments cost over five lacs and the Permanent Fund consisted of three lacs.

"From the start the aim has been to make the boys self-reliant and helpful to one another on the lines prevailing in a typical Hindu home. Almost all the work is done by the boys. Cleaning the premises, keeping it neat and tidy, purchasing the provisions and passing on the required quantity every day to the cooks; buying the milk, curdling and churning it into butter-milk; serving the food; cleaning the dining halls and verandahs; nursing the sick; carrying on the worship; settling the

games and any disputes that may arise on the playground and elsewhere—all these and many other affairs connected with the administration of the Home are in the hands of the boys...As the daily work of the Home is carried on by the boys themselves, by learning to look after their individual needs and the needs of their fellow-students, the boys learn what books cannot teach, the gospel of self-help and self-reliance through service."

*Prabuddha Bharata, January, 1929.*

The Ramakrishna Mission Vidyapith at Deoghar has now existed for eight years and already made a name for itself in the Province of Bihar and Orissa. But the most important project in which Swami Nirvedananda, who is really the greatest educational spirit in the Mission at the present time, is engaged is the organisation of a Students' Home Farm at Gauripur, some eight miles from Calcutta, for which 84 bighas of land have been acquired and which is intended to be a model Home for Indian youths. Subscriptions are being raised and it is expected that if this beautiful stretch of land can be properly developed it will undoubtedly prove to be an admirable abode for the Calcutta Students' Home with ample scope for future expansion and facilities for vocational training.

The Mission claims to solve the educational problem of the country by linking up instruction in the various traditional subjects with practice in the correct mode of living the daily lives, the whole theory being based on what Swami Vivekananda has said, viz, "The old institution

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\* This project is now (1943) in full working order and has been widely recognized and appreciated.

of living with the Guru and such like systems of imparting education are needed....What we want are, Western Science coupled with Vedanta, Brahmacharya as the guiding motto, and also Sraddha and faith in one's self. We must have life-building, man-making, character making assimilation of ideas."

I have tried to notice some of the more important types of Indian schools which have been in existence since the beginning of the century. There are others about which more informed and competent persons than myself will certainly speak when the time arrives. The Satsanga sect, for example, have not only developed the famous Dayal Bagh Institution at Agra but have started their industries elsewhere, too. The Shakti-Ashram at Rajpur at the base of the Mussoorie hills is an important educational development which is serving as an annual supplement to the incomplete education received by the boys and girls of the country in the existing schools. The educational activities of the Theosophical Society with its devoted band of selfless workers are bearing flowers and fruits in the four corners of the country. The Deccan Education Society and the Camp Educational Society in Bombay, the Montessori Society in the Bhavnagar State and Mrs. Cousin's Institution at Madras are some of the bodies and institutions, about which we hear and read from time to time.\* But all these are certainly not among those transient phenomena which

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\* During these intervening years (1930-43) the following have grown up;—

The Vidya-Bhawan of Udaipur and the Scindia School at Gwalior, the Jamia-Milia Islamia at Delhi, the Wardha Scheme and its off-shoot, the Basic Scheme in the U.P., and others.

always spring up in every country during the periods of renaissance. For they all seem to possess two important characteristics which make for stability and permanence, *viz.*, a vital contact with the actual life of the country and a firm conviction in the intensely spiritual character of their purpose.

The personalities around whom these schools and their like have been growing are among the most profound thinkers of the world. Swami Dayananda, Ramkrishna-Vivekananda, Rabindranath Tagore, Sadhu Vaswani, Gokhale, Sri Aurobindo, Mrs. Besant, Mahatma Gandhi are names which compel attention and evoke the most respectful reverence for their teachings, especially when those teachings give us examples and set up ideals calculated to lift up our vision towards a synthesis which is as old as it is new. The current system of Indian education appears to have done its work and is already out-of-date. Moreover, its avowed inability to provide for *all* the needs of this inherently spiritual country has always kept it incomplete and insufficient for her life's purposes. Scholars, who have pointed out that a great injustice has been done to India, with the danger of a profound loss to the whole world, by creation of a change of outlook in the English-educated young men of the country from the spiritual to the economic, have certainly been right. In the indigenous cultural scheme of social order 'the spiritual forms the highest and the economic the lowest, for the cultural and the spiritual are ends in themselves and are not pursued for the sake of anything else.' (Dr Radhakrishnan)

And it is this downward tendency "in the Indian mind brought about by a confusion between ends and means, that



nature has not been able to tolerate, with the result that India has started to find her own soul. It is but natural that all types of faith should get stirred all over the country and affect education more directly than any other sphere of life. The Christian Missionary is extremely busy in uplifting the condition of the depressed classes and organising education to suit their needs; the modern apostles of the Vedas are trying to reproduce in the youths of Northern India those sturdy types of Vedic humanity which, thousands of years ago distilled in Nature's own laboratory some of the finest and most enduring solutions of problems in metaphysics and philosophy; the votaries of Vedanta, fired by the faith of Ramakrishna-Vivekananda, are sacrificing themselves in inspiring the children of the soil with the ideal of realisation through service. It appears that spirituality has descended upon the land to dispel the gloom of intellectual confusion and moral poverty, and point out the way to a richer and more comprehensive life in this world and to a fuller and truer realisation of the beyond.

I read somewhere that in the West, private enterprise is pointing out the correct way of educational reform and the State is slowly adopting that way. If this be the natural order of things, the Indian schools of tomorrow may find their message in the institutions which are establishing their ideals and methods on the eternal truths of spirituality and at the same time working out a synthesis between the cultural and the material aspects of Indian life today. The present renaissance in India has developed a comprehensiveness which is unique in the annals of history. Hence it is necessary to realise that the current tendencies need an interpretation suited to the genius of

the country and calculated to transcend the meagreness of ideas propagated among the immature students through cramped literature and vitiated history. The truth has already been pointed out in words as clear as they are convincing, and applicable to the domain of Indian education as appropriately as to that of politics or economics or sociology,

“The Ancient Indian culture attached quite as much value to the soundness, growth and strength of the mind, life and body as the old Hellenistic or the modern Scientific thought, although for a different end and a greater motive. Therefore, to everything that serves and belongs to the healthy fulness of these things, it gave free play, to the activity of the reason, to science and philosophy, to the satisfaction of the æsthetic being and to all the many arts great or small, to the health and strength of the body, to the physical and economic well-being, ease and opulence of the race. There was never a national ideal of poverty in India as some would have us believe, nor was bareness or squalor the essential setting of her spirituality.....The aim was high, but firm and wide too was the base they sought to establish and great the care bestowed on the first instruments.....

“Necessarily the new India will seek the same end in new ways under the vivid impulse of fresh and large ideas and by an instrumentality suited to more complex conditions..... We should not allow our cultural independence to be paralysed by the accident that, at the moment Europe came in upon

us, we were in a state of ebb and weakness, such as comes some day upon all civilisations.....

"India can best develop herself and serve humanity by being herself and following the law of her own nature... It means simply to keep our centre, our essential way of being, our inborn nature, and assimilate to it all we receive and evolve out of it all we do and create. Religion has been a central preoccupation of the Indian mind ; some have told us that too much religion ruined India. But this is not true. If the majority of Indians had indeed made the whole of their lives religious in the true sense of the word, we should not be where we are now.....

"The right remedy is not to belittle still farther the age-long ideal of India, but to return to its old amplitude and give it a still wider scope, to make in very truth all the life of the nation a religion in this highest spiritual sense..... India can, if she will, give a new and decisive turn to the problems over which all mankind is labouring and stumbling..... Whether she will rise or not to the height of her opportunity in the renaissance which is coming upon her, is the question of her destiny."

SRI AUROBINDO, IN *The Renaissance in India*.

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### III

## A DECADE OF EDUCATION IN THE UNITED PROVINCES

1. *General Remarks.*—A comparative study of the Reports on Public Instruction, U. P., for the last dozen years or so reveals figures which lead to interesting and sometimes quite significant conclusions. In some ways this period, synchronising as it does with an era of constitutional reforms, may be supposed to be the precursor of the coming order of things.

The tables contained in this survey are based on the official reports on Public Instruction, annual and quinquennial, and lead inevitably to the conclusion that the period of continuous, and sometimes rapid, progress is practically over and, unless new financing agencies are forthcoming, the province will have to lie fallow at least for some time to come.

### 2. *Educational Institutions.*—

*Table 1. Number of Institutions.*

	1922	1927	1932	1934	1935
Recognised ...	18,555	22,068	23,521	23,107	22,640
Unrecognised	3,011	2,752	2,325	2,344	2,191

Table 2. *Recognised Institutions*

	1932		1934		1935	
	Male	Female	Male	Female	Male	Female
Maintained by Govt.	145	110	142	119	144	121
Maintained by Distt. Bd.	15,261	932	14,777	961	14,391	933
Maintained by Munpl. Bd.	962	238	959	245	978	257
Aided ...	4,899	758	4,886	817	4,813	801
Unaided ...	191	25	182	19	181	18

It is clear that, while the number of institutions for males has kept steady for the last four years, those for females have been trying to expand steadily, the limits probably being imposed by financial stringency.

3. *Enrolment.* — Progress in enrolment, considered from different points of view, has been uniformly satisfactory.

Table 3. *Number of scholars*

	1922	1927	1932	1934	1935
In recognised institutions	9,56,059	12,80,450	14,57,997	15,13,467	15,32,569
In unrecognised institutions	64,506	68,951	58,991	65,222	62,371

Table 4. *Enrolment at different Stages of instruction.*

	1922	1927	1932	1934	1935
University	3,10,3	5,892	7,772	7,867	8,488
Secondary	93,159	1,32,363	1,79,921	1,87,671	1,90,069
Primary	7,87,507	10,38,406	11,36,601	11,67,265	11,77,564

Table 5. *Percentage of scholars to population*

		1922	1927	1932	1934	1935
Male	...	3·7	5·15	5·3	5·4	5·5
Female	...	·43	·57	·72	·85	·89
Total	...	2·13	2·97	3·13	3·2	3·29

4. *Expenditure on Education.*—Owing to financial stringency Government had to curtail their expenditure on education during the last three years, but the following figures show how the rapid expansion of education in the province had been faithfully and sometimes lavishly supported by Government contributions during four quinquenniums.

Table 6. *Expenditure on education*

Year	Total	From Provincial Revenue
	Rs.	Rs.
1917	1,47,45,922	46,91,528
1922	2,98,13,563	1,56,14,803
1927	3,37,79,166	1,95,88,185
1932	3,89,21,112	2,17,97,033
1934	3,70,30,442	1,97,65,361
1935	3,80,41,838	2,10,76,130

Thus while in 1917 about one-third of the total expenditure on education was met from provincial revenue,

Government have since then steadfastly met *more than half* the total cost of education in these provinces

The distribution of expenditure over the various sources for the last three years was as follows :—

*Table 7*

	1932	1933	1934	1935
	Rs.	Rs.	Rs.	Rs.
Govt. Funds ...	2,17,97,033	1,99,48,589	1,97,65,361	2,01,76,130
Distt. Bd. Funds	36,90,879	32,26,836	32,48,612	32,49,032
Municipal Bd. Funds.	15,12,069	15,78,439	15,89,531	17,70,290
Fees ...	67,57,617	69,46,955	73,62,386	76,94,033
Other sources	51,63,514	54,19,768	50,64,552	51,52,353
Total ...	3,89,21,112	3,71,20,587	3,70,30,442	3,80,41,838

*5. Progress of important communities in education.—*

From the following tables it will be evident that the enrolment of Depressed Classes, Muhammedans and Females both Hindu and Muslim, has shown a steep upward tendency during the last twelve years or more.

*Table 8. Enrolment of male scholars receiving General Education : main classes only.*

	1922-23	1926-27	1931-32	1933-34	1934-35
Hindus					
Higher Castes ...	7,47,402	9,20,327	9,38,918	9,46,947	9,51,281
Depressed Classes ..	67,140	91,243	1,17,929	1,27,952	1,35,190
Muhammedans ...	1,75,644	2,25,547	2,51,092	2,63,112	2,56,989
Indian Christians ...	4,288	3,925	5,876	7,126	5,898

*Table 9. Enrolment of female scholars receiving  
General Education : main classes only.*

	1922-23	1926-27	1931-32	1933-34	1934-35
Hindus					
Higher Castes ...	46,543	59,004	1,24,713	1,48,205	1,56,842
Depressed Classes	1,295	2,352	5,284	6,296	6,612
Muhammedans...	10,403	14,475	26,011	29,665	30,280
Indian Chris- tians ...	4,687	4,605	5 340	4,723	4,913

*Table 10. Percentage of enrolment to population.*

		1922-23		1926-27		1933-34		1934-35	
		Male	Female	Male	Female	Male	Female	Male	Female
Hindus- ...		4.0	0.26	5.0	0.33	5.0	0.8	5.05	0.86
Muhammedans ...		5.2	0.33	6.8	0.47	7.0	0.84	6.8	0.89
Indian Christians ..		4.9	5.8	4.5	5.6	8.1	5.7	6.6	6.0

The remarkable progress of Muhammedans and the females of both communities (Hindus and Muhammedans) on the basis of population has been a special feature of the last decade.

*Table 11. Progress of enrolment of Muhammedan males.*

	1923	1927	1932	1934	1935
Primary Stage	1,33,381	1,75,424	1,97,093	2,07,152	1,99,832
Middle „	11,176	15,217	21,736	22,788	23,120
High „	2,178	2,472	3,994	4,466	4,743
Intermediate Stage	700	1,177	1,188	1,406	1,534
University Stage	420	1,119	966	1,045	1,081



The following table shows that an expansion of basic education among the depressed classes is steadily increasing the number of scholars going in for higher education, while spreading the benefits of literacy among the large majority.

*Table 12. Progress of enrolment of the Depressed Classes; males only.*

	1923	1927	1932	1934	1935
Primary Stage	64,455	86,179	1,11,484	1,19,786	1,27,558
Middle „	1,348	1,359	3,187	3,652	3,797
High „	27	41	199	206	128
Intermediate Stage	40	11	3	11	130
University Stage	...	1	9	12	17

6. *Education of Women*.—Indications of a persistent expansion of the number of institutions as well as their enrolment are clear from Tables 2, 9 and 10. The following table shows this expansion over all the stages of education.

*Table 13 Progress of enrolment of girl scholars.*

	1923	1927	1932	1934	1935
Primary Stage	60,460	77,286	1,53,929	1,79,804	1,89,191 (+76,222)
Middle „	2,140	2,807	5,289	6,843	8,092 (+ )
High „	278	343	543	727	821 (+125)
Intermediate Stage	59	87	158	212	263
University Stage	15	30	112	131	176
Vocational and Special Stage	526	868	1,123	1,320	1,263

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Represents the number of girls in boys' institutions.

Table 14. *Expenditure on Female Education.*

YEAR	TOTAL	FROM PROVINCIAL REVENUE
	Rs.	Rs.
1922-23	11,40,571	4,46,420
1926-27	14,42,183	6,88,351
1931-32	19,28,697	9,74,340
1933-34	20,79,567	10,50,535
1934-35	22,43,453	11,27,159

Thus it is evident that Government have been liberally financing girls' education and the Director of Public Instruction rightly observes in his General Report on Public Instruction for 1933-34 that he looks upon 'the new spirit in regard to girls' education in these provinces as the most important outcome of the work of the Education Department during the past 20 years.'

#### 7. *Some General Observations.*

(a) *Primary Education*.—In spite of a fairly rapid increase in the number of scholars in primary schools, the result cannot be pronounced as satisfactory. An analysis of the figures for attendance in different classes shows that over 80% of the enrolment is limited to the three lowest classes and that the vast majority leave school at about the middle of the primary stage without attaining literacy.

There are, however, clear indications of better conditions in the future, for, with teachers trained in modern play-way methods of teaching and with provisions for connecting school work with the actual day-to-day lives of the

rural masses, primary education appears to be gaining in popularity. Boys now learn to make mats, fans, carpets, lamp wicks, soap, baskets etc., to repair beds, to grow vegetables, and to use both their wits and their hands in a large variety of ways. Education weeks and educational exhibitions are quite common and, with their work and play features proportionately mixed up, are providing a valuable stimulus towards making primary education more useful and popular

(b) *Secondary Education*.:—For many years past secondary education in these provinces has been steadily improving by the inclusion of such useful subjects as Science, Nature Study, Manual Training, Hygiene, Physical Training, Agriculture and Music, thus paving the way for the evolution of a definite form of secondary education along the lines suggested in the first Hadow Report in England in 1927. From the days of the Sadler Commission the criticisms levelled against the too bookish system of secondary education in India have been regular and numerous. Government have now directed their attention towards a reform of secondary education, inviting suggestions along definite lines, and it is expected that these suggestions, considered side by side with the findings of the Unemployment Committee, will lead to a better state of affairs.

Some special features of the present-day secondary education are practical and vocational training through the subjects already mentioned, provision of school meals, rapid expansion of Scouting, First Aid and Junior Red Cross movements among all types of schools, regular medical inspection of the school population and treatment in a

limited number of cases, and definite indications of educational experimentation and investigation conducted by responsible teachers in different parts of the province. Another noticeable feature of Anglo-Vernacular education is the adoption of Hindi and Urdu as the media of instruction as well as examination, like English, up to the High School stage.

(c) *Education in the Legislative Council*.—The interest evinced in the Provincial Legislative Council in different aspects of education has been considerable every year, special attention being devoted to the education of women, depressed classes and Muslims. But, for want of funds, many useful schemes have been held up. There appears, however, a need for showing a better sense of proportion, covering all the stages of education, and paying the proper amount of attention to each stage, commensurate with its aims, methods and results. It seems imperative that a clear-cut and comprehensive Educational Policy should be enunciated for the United Provinces in the near future.

IV  
ANGLO-VERNACULAR EDUCATION IN THE  
UNITED PROVINCES

*(Tendencies in Expansion)*

It is an interesting study to compare figures for the last ten years or so and notice the tendencies which are indicated by them. It is hardly necessary to comment on them ; they are so irresistibly expressive and suggestive that the Government, the Intermediate Board and the country have to face and deal with them in a more sensible, sympathetic and practical manner than has been the case during this period of expansion.

*(a) High School Examination.*

1. *Number of schools recognised by the Board*

<i>Year</i>	<i>Total</i>	<i>Girls</i>	<i>Boys</i>
1933	216	9	207
1934	227	15	212
1935	235	15	220
1936	251	19	232
1937	254	17	237
1938	264	23	241
1939	276	27	249
1940	291	29	262
1941	314	40	274
1942	328	42	286
Percentage of increase in ten years }	52	366	38

2. *Number of candidates taking the Examination.*

<i>Year</i>	<i>Total</i>	<i>Girls</i>	<i>Boys</i>
1933	10655	233	10422
1934	11937	234	11703
1935	12637	352	12285
1936	13422	446	12976
1937	14392	565	13827
1938	14878	689	14189
1939	15445	873	14572
1940	16580	1144	15436
1941	17610	1358	16252
1942	19250	1579	17671
Percentage of increase in ten years }	81	578	69

3. *Number of candidates sent up per school.*

This number can easily be calculated on the basis of the figures given in the two tables above. The following table clearly shows that, in spite of expansion, the number of boys sent per school for the Board's High School Examination has kept level during the past four years whereas the

number of girls similarly sent up has been steadily increasing since 1934.

<i>Year</i>	<i>Total</i>	<i>Girls</i>	<i>Boys</i>
1933	49·3	26·0	50·3
1934	52·6	15·6	55·2
1935	53·8	23·5	55·8
1936	53·4	24·5	56·0
1937	56·7	33·2	58·3
1938	56·3	30·0	58·9
1939	56·0	32·3	58·5
1940	56·9	39·4	58·9
1941	56·1	33·9	59·3
1942	58·7	37·6	61·8
Ten years' average	55	29·6	57·2

*(b) Intermediate Examinations.*  
*1. Number of Colleges recognised by the Board*

Year	Intermediate		Intermediate in Commerce		Intermediate in Agriculture		Total
	Girls	Boys	Total	Commerce	Agriculture	Total	
1933	3	33	36	9	4	49	
1934	4	33	37	9	3	49	
1935	4	34	38	9	3	50	
1936	5	35	40	9	3	52	
1937	5	35	40	9	3	52	
1938	6	40	46	11	3	60	
1939	7	41	48	11	3	62	
1940	8	43	51	14	4	69	
1941	8	48	56	15	4	75	
1942	11	55	66	19	5	91	
Percentage of increase in ten years.	267	67	83	111	25	857	



5. *Number of candidates taking the Examinations.*

Year	Intermediate		Total	Intermediate in		Total
	Girls	Boys		Commerce	Agriculture	
1933	101	3482	3583	325	70	3978
1934	120	4020	4140	372	76	4588
1935	131	3950	4081	378	81	4540
1936	158	4015	4173	437	77	4687
1937	174	3968	4142	447	89	4678
1938	258	4329	4587	497	90	5174
1939	371	4396	4767	579	100	5446
1940	454	4698	5152	756	192	6100
1941	626	5387	6013	897	272	7182
1942	734	5748	6482	1033	315	7830
Percentage of increase in ten years.	627		81	216	350	97

6. *Number of candidates sent up per college*

Year	Intermediate		Total	Intermediate in Commerce		Intermediate in Agriculture	All Intermediates
	Girls	Boys					
1933	33.7	106.0	99.5	36.1	17.5	81.2	
1934	30.0	122.0	120.0	41.3	25.3	93.6	
1935	32.7	116.0	107.4	42.0	27.0	90.8	
1936	31.6	114.7	104.3	48.5	25.7	90.1	
1937	35.0	113.4	103.5	49.7	29.7	90.0	
1938	43.0	108.2	99.7	45.2	30.0	86.2	
1939	53.0	107.2	99.3	52.6	33.3	87.8	
1940	56.0	109.5	101.0	54.0	48.0	88.4	
1941	78.2	112.2	107.4	59.8	68.0	95.8	
1942	66.8	104.5	98.2	54.4	63	86	
Ten years' Average	46.0	111.4	104.0	48.4	36.8	99.0	

*(c) The Educational Budget.*

7. That the growth of education absolutely depends upon government policy, of which grant-in-aid forms the most important part, needs no repetition. A comparison of the Budgets of the Educational Department and of the Intermediate Board will show what effect they had on the expansion indicated in the foregoing tables.

Year	Educational Budget	Board's Budget
1933-34	192,63,349	2,40,144
1934-35	199,39,135	2,51,593
1935-36	206,85,335	2,67,367
1936-37	206,99,005	2,83,754
1937-38	207,53,108	2,69,194
1938-39	210,67,454	2,76,667
1939-40	215,14,423	2,68,807
1940-41	216,71,252	2,82,724
1941-42	222,50,360	2,88,044
1942-43	225,67,949	3,15,332
Percentage of increase in ten years	} 17.1	31.3

*(d) Broad Conclusions.*

8. That the parallel expansion at the High School and Intermediate stages has maintained its normal course would be evident from a rough-and-ready test, viz., from an

estimate of the casualty suffered by the High School candidates of a certain year at the Intermediate stage two years later.

Year	No. of High School candidates	Year	No. of Intermediate candidates	Percentage of casualty
1933	10655	1935	4540	57
1934	11937	1936	4687	61
1935	12637	1937	4678	63
1936	13422	1938	5174	61.4
1937	14392	1939	5446	62.1
1938	14878	1940	6100	59
1939	15445	1941	7182	53.5
1940	16580	1942	7830	52.1

Average casualty for 8 years 58.6%

9 (a) At the high school stage boys' schools have increased in ten years (1933-42) by 38% in number and by 69% in output, whereas girls' schools have increased by 366% in number and 578% in output. The figures for total increase are 52% in number and 81% in output.

(b) At the intermediate stage, during the same period, the figures for increase are (i) for boys' colleges, 67% in number and 65% in output, (ii) for girls' colleges, 267% in number and 627% in output, and (iii) for all colleges, 86% in number and 97% in output.

(c) The expansion is considerable in Intermediate in Commerce, especially during the last three years, but there is no reliable indication that intermediate in Agriculture is popular or expanding; it has practically been at a standstill for seven years although the rise in the number of candidates continues from the year 1940

10. The remarkable expansion in the case of girls has been due to the policy of the government in favour of women's education, towards which considerable funds have been diverted. It is also well-known that funds had to be provided in recent years for special purposes, of which the education of depressed classes, the introduction of the Basic Scheme, the encouragement of Muslim institutions and provision for Adult Literacy are notable examples.

But, as the Educational Budget has kept practically at the two crore-level for at least ten years, it was inevitable that the aid rendered to the 'general' type of schools and colleges in the past should suffer on account of the new demands made on the purse of the Educational Department. In other words, the general types of High Schools and Intermediate Colleges have been growing both in number and output in spite of a lack of willing financial assistance from Government and in face of a lack of opportunities for employment in the world outside.

Two important consequences are bound to follow from this situation of stagnation of government funds at a certain fixed level and a natural and steady growth of schools and colleges. One of them would be (or should be) greater provision of funds from non-government sources. But, as there is no tradition worth the name for such provision, the other result would be a steady impoverishment of the re-

sources and facilities of existing institutions and growth of indigent and inefficient new institutions, both leading to poorly paid and heavily worked staff. The latter consequence is already working in non-government institutions on a wide scale and is fast becoming a rule except in well-endowed schools and colleges.

*(e) The Board's Income and Expenditure.*

*(Finances of an examining body).*

11 The figures for the Board's actual income and expenditure have their own interesting story to tell. It may be noted that the actual income from examination fees and sale of waste paper etc., is not allowed to be used by the Board but is merged into Government revenue and the actual expenses are met out of the annual allotment (which is much less than the actual income) made in the Educational Budget.

Year.	Actual Receipts.	Actual expenditure	Savings
	Rs.	Rs.	Rs.
1926-27	1,96,929	1,69,324	27,605
1927-28	2,21,103	1,94,577	26,526
1928-29	2,42,409	2,12,679	29,730
1929-30	2,06,218	2,38,592	nil
1930-31	2,22,020	2,16,350	5,670
1931-32	2,39,818	2,11,904	27,914
1932-33	2,62,805	2,24,095	38,710

Year.	Actual Receipts.	Actual expenditure.	Savings
	Rs	Rs.	Rs.
1933-34	2,95,978	2,40,144	55,834
1934-35	3,02,391	2,51,593	50,798
1935-36	3,12,273	2,67,367	44,906
1936-37	3,27,066	2,83,754	43,312
1937-38	3,44,337	2,69,194	75,143
1938-39	3,46,687	2,76,666	70,021
1939-40	3,76,166	2,65,568	1,10,598
1940-41	4,15,338	2,97,833	1,17,505
1941-42	4,50,060	3,32,728	1,17,332

12. It seems clear that unless the U. P Board has a special luck in its favour, all examining bodies make substantial savings out of the examination business. A proof of this conclusion is the fact that the Ajmer Board, within a few years of its coming into existence, has been able to build up a handsome landed and building property of its own mostly out of its savings.

How these savings are or should be used is outside the scope of this study. But a look at the savings made by the U. P. Board shows that the rate of increase of these savings from year to year does not bear any relation to the rate of increase in the income or in the expenditure. In plain language it may be said that the Government, by maintain-

ing this Board, is running a lucrative business, for it is clear that, whereas the savings were at the 14% level up to 1936-37, they shot up to 28'3% in 1940-41 and 26% in 1941-42. Perhaps this fact led to a substantial increase in the Board's allotment in 1942-43.



# V

## AGE-DISTRIBUTION IN ENGLISH SCHOOLS IN THE U.P.\*

### A.—*Introductory Note.*

1. *Aim*.—The aim of the present investigation is to show how an objective and statistical survey of even a very simple and apparently unimportant educational matter can point out serious defects in our current school practice, and at the same time suggest what should be done, if the defects are admitted, to remedy them.

2. *The Data*.—The investigation is based on data collected for three consecutive years. A number of High Schools and Intermediate Colleges in the U.P. were selected at random and were requested to send me, in the tables supplied, the number of pupils of different ages reading in the different classes on the 1st August, the date having been chosen arbitrarily to ensure uniformity. The tables show the age distribution of 3180 scholars in 1931, of 5967 scholars in 1932, and of 18298 scholars in 1933.

The figures for the first two years were worked upon in the 'first' instance by my colleague, Mr. S. C. Kapoor, M.A., L.T., B. Ed., whose findings have already appeared in the *Bulletins* of the Agra Training College Association and in the June, 1933, number of the *Teaching* (Oxford University Press). I have worked upon the table with the help of Prof. P. C.

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\* Reprinted from All-India Education Bulletin of All-India Federation of Teachers' Associations, December, 1933.

Mahalanobis, I.E.S., of the Statistical Laboratory, Presidency College, Calcutta, and only my share of the study is set forth in this paper.

3. *An Age-Range for each Class*:—At first glance the large scatter of ages in all classes of our schools may appear disconcerting to the careful educationist, and the trained teacher may feel that all his cherished ideas on classroom method and its relation to and dependence on the age and ability of scholars are shattered by the prospect of facing classes where children and adolescents are hopelessly huddled together. But, even in the absence of a clear-cut educational policy fixing, not merely an arbitrary maximum age-limit for each class as in para 96 (f) of the Educational Code, but an appropriate age-range, it is somewhat reassuring to find that the figures point to the existence of a fairly well-defined age-range which can be made the basis of a reform of far-reaching importance.

If a large majority (about 70 per cent) of pupils in each class are found to lie within an age-range of four years, it does not seem reasonable to allow pupils outside this range to get mixed up with those within it and, without much profit to themselves, create complex problems of organisation, teaching and discipline in each class.

#### 4 *Limitations of the Investigation*:—

(1) The age-figures are only approximately correct, for it is a notorious fact that the dates of birth of scholars are seldom correctly supplied by parents and guardians on their first Admission Forms, and a well-known regulation does not permit any subsequent correction in the age-record of a scholar. But, as the dates of birth supplied by parents

are generally lower than the actual ones, and as the number of such under-age data cannot be very large, the findings of the investigation can safely be assumed to convey a fairly correct idea of the existing state of affairs

(ii) The figures for Classes III and X for scholars below seven and over twenty-one years of age, being indefinite adversely affect the Mean and the Standard Deviation for those classes but not to such an extent as to render them unacceptable for the purpose of a general survey.

(iii) Although the figures for 1933-34 constitute only about 20 per cent of the total school population, they have proved quite satisfactory for the purpose of the investigation. The distribution, the Means and the Standard Deviations for the three years tally fairly satisfactorily and the figures are fully representative of the whole province and of all types of Anglo vernacular schools, good, bad and average, and with enrolment varying from over six to less than two hundred

I may also add that the reliability of the samples has been tested and found satisfactory for the purpose of statistical study.

(iv) It is quite likely that, in a vast and varied province like the U P, certain areas may be more backward in education than others and have pupils with higher ages in their schools, thereby raising the Mean for the whole province. This points to the need for regional surveys which may be undertaken with great benefit to school education and organisation in the respective areas.

It may also be noted here that boys from Vernacular schools come in fairly large numbers to the A. V. schools after passing the Vernacular Final Examination and, being

generally older than the scholars in the latter type of schools, tend to raise the Mean age of the Middle and the High Sections. This may quite profitably be made the subject of a separate investigation.

(v) My great regret is that, in the absence of a satisfactory instrument for mental measurement, the results of the present investigation are only partially suggestive and effective. If school organisation and instruction are intended to suit the real needs of children through a system of satisfactory classification, such classification should be based not only on the physical age of scholars but also on their mental age. "The golden rule should be: promote by attainment rather than by age, and by ability rather than by attainment ... First consideration is always to be accorded to the child's innate intelligence." (Burt).

In our schools we attend mostly to the attainment of the scholars (and that, too, by means of a defective and incomplete system of examination) and a little to their physical age (probably because the Code emphasises this consideration), but never to the most important item, their ability. The present survey will be complete only when it is coupled with a chart of mental ages for the purpose of recommending a satisfactory age-range for each class of our schools.

In spite of all this, however, such factors as physical age and size cannot be neglected, for it is not desirable to have, especially in the Middle and lower sections, small children of nine and ten side by side with growing and grown-up adolescents of fourteen and above, for the unstable mental and physical characteristics of the latter require a different course of treatment from the compara-

tively simple needs of the former. Hence I believe that the present investigation has its own value in drawing pointed attention to the objectionably large scatter of ages in every class and the consequent need for a more sensible system of pupil classification in our schools.

*Table 1.*

	III	IV	V	VI	VII	VIII	IX	X
Mean age	1931 8'78	9'94	10'68	11'79	13'44	14'63	15'64	16'96
	1932 8 9	9 7	10'95	12'19	13'87	14'89	16'4	17'63
	1933 8'77	9'85	10'8	12'11	13'51	14'89	16 15	17'33
Standard deviation	1931 1'93	1'51	1'75	1'81	1'87	1'87	1'67	1'34
	1932 1'58	1 63	1'76	1'87	1'95	1'87	1'89	2'00
	1933 1'73	1'77	1'82	1'97	2'10	1'97	1'91	1'83

### *B.—Observations.*

1. From the Frequency Distribution Tables appended to this paper the above table has been prepared, and it shows in a very clear manner that the mean ages for the various classes are fairly constant. The meaning of Standard Deviation is that 68'24 per cent of the total population lie between " $\text{Mean} \pm \text{S.D.}$ " In other words, twice the S. D for each class gives the range within which over two-thirds of its population are included.

A comparison on this basis of the S.D s for the three years under investigation clearly shows that more than two-thirds of the scholars in *each class* are included within an age-range which is less than four years. And, if we make it full four years, we can reasonably suppose that a large

majority, and really those who can be called fit for the class, come within this *Standard Age-Range*.

For obvious reasons I shall now restrict my observations to the figures for 1933-34, referring to those of previous years only for the sake of comparison.

2. The following table shows the maximum ages of 68 percent of the scholars in the various classes :—

*Table 2.*

	III	IV	V	VI	VII	VIII	IX	X
Maximum Age	10.5	11.62	12.62	14.08	15.61	16.86	18.06	19.21
Minimum Age	7.04	8.08	8.98	10.14	11.41	12.92	14.24	15.45

3. If this range is marked off on squared paper we have a clear picture showing the scatter and approximate number of those who fall outside the range. (Appendix II). The following table shows the approximate number and the scatter in years of the overage and underage scholars in each class, the calculations being based on the assumption that the total number of scholars in each class is uniformly spread over the square representing that class

*Table 3.*

	III	IV	V	VI	VII	VIII	IX	X
Underage no. ...	205	294	326	370	439	459	467	415
Scatter ...	1	2	3	3	3	4	4	4
Overage No. ...	248	280	367	381	530	451	368	371
Scatter ...	5	6	5	6	6	5	4	3

Here it is indicated clearly that, although the number of overage and underage scholars is practically the same in each class, the scatter of the former is far wider than that of the latter, which means that there are in every class a few grown-up boys who are progressively too overage for that class when compared with those who are underage

3. The difference between the Means for Classes III and X shows that the courses of study prescribed for eight years are done by the average scholar in nearly ten years, the time lost being from one-third to half-a-year in each class from Class VI onwards. If a record could be kept of those who pass every year from class to class the time lost by the rest in covering the eight years' course could easily be found to be three, four or even five years.

Further investigation seems to be necessary for finding out as correctly as possible at what stage the average scholar loses most time and why. If the loss, as indicated in the present study, is caused mostly in the middle stages, it is very necessary to find out if it is due to a lack of proper educational treatment of the scholars during their early adolescence which corresponds to these stages.

4. For the sake of comparison I made a separate study of the population in Government and Non-Government schools. The results obtained for 19 of the former and 18 of the latter type are set forth below.

*Table 4.*

Mean Age	III	IV	V	VI	VII	VIII	IX	X
Govt. ...	8.52	9.47	10.41	11.66	13.33	14.68	16.00	17.23
Non-Govt., ...	8.94	10.12	11.03	12.3	13.71	15.02	16.21	17.52
S.D.								
Govt. ...	1.76	1.64	1.70	1.82	2.05	1.9	1.93	1.96
Non-Govt. ...	1.7	1.74	1.8	1.9	2.0	1.87	1.16	1.9

It appears that the Mean Age for Government Schools, is on the average 0·45 years lower than that of the Non-Government schools, although the S. D. is practically the same. The *scatter*, too in the case of the overage pupils is much wider, as will be evident from the tables appended to this paper. Apart from this fact all the three previous observations hold good in the case of both types of schools.

5. Mr. Kapoor has suggested that, whatever tentative measures are adopted to reduce the present age-range of school children to a reasonable extent, the ultimate aim should be to bring it down to the following scale

*Table 5.*

Class	III	IV	V	VI	VII	VIII	IX	X
Age-range	7-10	8-11	9-12	10-13	11-15	12-16	13-18	14-19

I agree with this suggestion, for it allows for a satisfactory variation of years in all the educational stages, Primary, Middle and High, corresponding to, although somewhat more liberal than, the variations indicated in my consolidated tables. The maximum age of 19 for the High School stage should enable a majority of our youths to start their life's business at the prescribed legal age for attaining majority, and not waste their time and energy, as well as those of others, by stagnating in schools at a time when they should be shouldering adult responsibility.

### *C.—A Suggestion.*

Now, when all is said and done, the fact will always remain that, under all conditions, retardation and acceleration will exist and will consequently necessitate separate



treatment of the two classes of scholars created in the process. There are various ways of tackling the situation, but, before anything is done, we have to be careful lest we do injustice to any group of children by simply considering their physical age. It is time that serious efforts were made by competent scholars and psychologists in the province to frame and standardise mental tests suitable for all grades and types of children, so that an instrument of mental measurement may be available for diagnosis and classification inside the school.

And, when proper classification has been done, and retarded and accelerated groups separated from the rest, it will probably be the duty of Government schools to show how properly to manage and educate such groups instead of continuing to do what other schools are doing quite well.

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# APPENDIX I

## Age-Distribution Tables.

Table 1 (1931)

	7 years	III	IV	V	VI	VII	VIII	IX	X	Total
Below										
Bet	7-8	24	1	10						25
"	8-9	52	17	54	11					79
"	9-10	41	68	82	50	5				174
"	10-11	40	69	102	106	23	4			246
"	11-12	19	56	66	93	103	21	6		310
"	12-13	14	41	36	66	95	82	21		344
"	13-14	5	15	29	48	95	100	60	5	320
"	14-15	2	8	7	31	80	80	105	28	347
"	15-16	1	1	6	11	54	85	100	75	333
"	16-17			3	8	23	53	84	73	332
"	17-18				4	16	24	93	100	244
Over	18 years					8	30	38	113	237
Total	...	198	277	395	428	502	479	507	394	3,180

Table 2. (1932)

		III	IV	V	VI	VII	VIII	IX	X	Total
Below 7 years		43	16	1						60
Bet. 7-8		101	73	14	1					189
" 8-9		97	146	75	7	1				326
" 9-10		89	144	127	69	8				437
" 11-11		57	120	159	143	44	4			527
" 11-12		27	75	126	169	105	40	3		545
" 12-13		13	37	94	123	179	104	25	2	577
" 13-14		3	15	55	100	201	159	67	15	615
" 14-15		1	3	19	50	141	157	141	48	560
" 15-16				13	65	119	153	168	113	631
" 16-17			1	2	12	87	137	189	110	538
" 17-18					3	45	83	142	113	386
" 18-19		1			1	15	23	109	129	278
" 19-20						3	12	66	95	176
" 20-21							2	19	55	76
Over 21 years								7	39	46
Total	..	432	630	685	743	948	874	936	719	5,967

Table 3. (1933)

## Age Distribution of Students in 46 Schools in the U. P.

No. of Students, on August 1, 1933, in the Class

Age (On Aug. 1, 1933)		III	IV	V	VI	VII	VIII	IX	X	Total
Below	7 years	189	20	2						220
Bet.	7-8	410	238	71	10					729
"	8-9	341	312	258	52	7				970
"	9-10	240	383	463	249	36				1376
"	10-11	151	315	494	410	214	5	3		1615
"	11-12	93	212	343	500	438	28	13		1730
"	12-13	49	107	245	400	525	131	90	16	1751
"	13-14	17	63	146	303	495	432	262	63	1781
"	14-15	11	24	87	183	434	493	411	186	1829
"	15-16	3	3	31	135	301	454	549	332	1808
"	16-17			9	49	251	391	498	459	1659
"	17-18		2	1	20	106	244	412	472	1256
"	18-19				8	36	113	293	399	849
"	19-20				1	11	25	130	260	427
"	20-21					6	11	41	161	222
Over	21 years					8	3	14	51	76
Total	...	1504	1689	2150	2320	2868	2649	2719	2399	18298

Table 4.

Age Distribution of Students in 19 Schools (Govt.)

No. of Students, on August 1, 1933, in the Class.

Age  
(On August 1, 1933)

	III	IV	V	VI	VII	VIII	IX	X	Total
Below 7 years	112	17							129
7-8	203	128	44	6					381
8-9	136	152	145	34	2				469
9-10	79	165	212	128	26	4			614
10-11	42	122	187	189	124	12	2		678
11-12	33	59	127	183	178	65	4		649
12-13	24	34	96	155	196	135	43	10	692
13-14	3	18	42	92	182	185	135	36	693
14-15		5	22	60	176	160	164	103	690
15-16			5	39	111	183	196	164	698
16-17				7	83	176	173	160	599
17-18				1	31	84	159	170	445
18-19					9	27	129	167	332
19-20					3	1	48	121	173
20-21					1	1	8	58	68
Over 21 years							1	10	11
Total	632	700	880	894	1122	1033	1061	999	7321

Table 5.

## Age Distribution of Students in 18 Non-Govt. institutions.

No. of Students, on August 1, 1933, in the Class

Age (On August 1, 1933)		III	IV	V	VI	VII	VIII	IX	X	Total
Below 7 years		52	10	2						64
Between 7-8 "		138	62	16	3					219
" 8-9 "		136	102	77	12	5				332
" 9-10 "		108	135	164	82	7	1	1		497
" 10-11 "		68	149	223	155	57	11			664
" 11-12 "		33	102	154	238	188	39	6		760
" 12-13 "		18	41	99	175	227	114	36	3	713
" 13-14 "		6	23	69	153	238	168	89	21	767
" 14-15 "		4	10	43	85	177	235	166	49	769
" 15-16 "		3	3	13	55	125	196	221	113	731
" 16-17 "			2	5	21	115	139	203	142	627
" 17-18 "				1	13	48	103	172	181	518
" 18-19 "					2	13	57	111	146	332
" 19-20 "					1	5	14	52	87	159
" 20-21 "						3	4	24	74	104
Over 21 years							3	8	21	32
Total on Roll		566	639	866	995	1210	1084	1088	840	7288

In this connection the following extract from a lecture delivered by Dr. E. O. Lewis, M.A., D.Sc., M.R.C.S., L.R.C.P., before the Annual Conference of the National Union of Teachers, England, held at Great Yarmouth, in April, 1931, would prove relevant as well as useful :—

“The retarded child will have to be conceived as a potential or actual menace to the welfare of the community. An unduly large proportion of the money spent on social services is absorbed by the ‘Social-Problem Group’. The time and energy of the relieving officer, the general practitioner, the staffs of hospitals, the officers of charitable organisations, the magistrates and police, and of other persons engaged in social work, is taken up to a large extent by members of this comparatively restricted section of the community ; and many of these officers affirm that the time, energy and money is unprofitably spent . .

In the group of retarded children several types of retardation are represented. Many are retarded only temporarily ; a late start in attending school, irregular attendance or frequent changes of school may account for their backwardness. Then again, their backwardness may be due to poor home conditions and the physical, mental and social disadvantages associated with such conditions. The fact that numbers of children belong to this sub-group in which the causative factors are of an extrinsic character, and may, therefore, be remedied, calls for elasticity in our educational schemes for these children. It should be possible for them, if and

when they overtake their arrears, to be transferred to the classes for normal children of their own age. The parallel class system adopted in many large schools seems well suited to meet the needs of this sub-group .....

An educational retardation of two or more years at the age of ten is so marked that a child of average intelligence, when handicapped only by extrinsic factors such as those mentioned above, seldom falls behind his fellow pupils to this extent, especially in these days of scientific teaching methods. Most investigators of retarded children would agree that the majority of children are retarded because they have subnormal intelligence ..

The physical, intellectual and temperamental characteristics of dull children of adolescent age are so distinctive that there seems to be much force in the contention that the special needs of these children can be adequately met only by the organisation of separate schools, departments or classes. Much can be said in favour of the view that in a post-primary system for retarded children the practical aspects of education should predominate and during the last two years of their period at school the training should have a definite vocational bias.

The task of the average teacher, however, still continues to be unnecessarily onerous; and this is due to the variety of pupils found in single class. A group of children aged five, admitted to school for the first time, will manifest in their intellectual attainments a spread over three years—the majority will



have the attainments of a normal child of five, but at least 10 per cent. will have the attainments of a normal child of six and an equal proportion those of a normal child of four. As the children grow older the amount of scattering increases appreciably until, at the age of 11, it spreads over at least six years. It is true the scatter in the various classes is reduced to some extent by the rapid promotion of the bright children but even so, in most classes there are so many groups of children at different levels of attainment that it is impossible for the teacher with 40 pupils to avoid wasting much time and energy. The removal of most retarded pupils to special classes would doubtless increase the efficiency of class work considerably.

Age classification with the cleavage at 11 *plus* is accepted as the basis of reorganisation ; but, unless there is a further classification in accordance with the special educational needs of the chief groups of children, the reorganisation will effect no great advance....."

## VI

### A STUDY OF SCHOOL ERRORS

(*Note.*—An objective study of errors committed by children in their written work furnishes interesting information to the teacher. Each subject has its own story to tell and the teacher will always find this story having a direct connection with the *method of teaching* which he proposes to adopt in the classroom. I suggest that, if teachers study the children's errors in the various classes for a number of years, they can form, in a really objective manner, a correct idea of the nature of errors committed in those classes, and thus be in a sound position to avoid giving the students opportunities for committing those errors again and again.

Four of my students studied errors in English and Arithmetic at the Agra Training College in 1934 and their study is reproduced below from the 3rd Annual Bulletin of that college. If such studies are continued from year to year by teachers they can easily improve their method to the extent that their students will not ordinarily commit most of those mistakes which they commit at present. *D.N.M.*)

#### I. ERRORS IN ENGLISH

Our object, here, is not to point out what prevents our pupils from attaining language perfection but to focus our attention on those broad aspects of errors which retard the smooth progress of our pupils in learning the English language. The following is a list of the mistakes collected by

us from Classes V to VIII at the Government High School, Agra :

### *Spelling Mistakes.*

(a) Motor centres of the pupil might be working faster than the brain, or the organization of the engrams relating to a particular word has not been effective, and hence we come across the following mistakes in our pupils' writing :

Molen, furit, wakled, nueter, etc.

(b) The difference between words identically or similarly sounded has not been explained in contrast :

Shell, beg, rains together, instead of shall, bag, reins, to-gather.

(c) Broad principles of spelling have not been properly taught, or grasped by the pupils :

Comming, beginng, untill, handfull, shiper, dropped, etc.

(d) Teacher's pronunciation is defective and hence the following type of mistakes occur :

Had master, twanty, buety, frome, leaves (instead of lives), etc.

(e) Incidental slip and omission occur due to inattention on the part of the pupils :

neels instead needles, axamnation, a pupil copying the word 'death' from the b.b. writes "dath."

(f) Some spelling mistakes occur due to the defective system of English spelling. It means there is no correspondence between the sounding or pronunciation and the spelling of a word :

Surch, sertain, kap etc.

*How to avoid such Mistakes.*

1. We should encourage as much extensive reading as possible on the part of our pupils. For this purpose a number of short and easy books should be procured.
2. A list of the common difficult words should be hung in the class. One list of the same words should be with every pupil, which he should go through every morning.
3. The teacher should insist on the pupils' transcribing faithfully either from the b.b. or from their books.
4. The teacher should be very careful about his own pronunciation while speaking in the class.
5. There ought to be a dictionary with every pupil for reference during the English period.

*Grammatical Mistakes.**(a) Wrong use of pronouns—*

(Class VIII) I saw a thief which was making off to hide himself. He requested whether I might go. Will Mohan keep your promise ?

*(b) Omissions and wrong use of words :*

(C. V.) Mohan's friend will by evening train to-morrow. I will go to Cawnpur yesterday.

(c) Proper place of the subject, the verb and the object not known to the pupils :

(C. V.) What Ram your clothes put on now. Mohan do not is practice.

(d) Wrong use of tenses —The mistakes of the wrong use of tenses are especially of frequent occurrence in the change of narration e.g., He requested whether he may go. He said that he will go to Delhi tomorrow.

A frequent error in the change of narration is the wrong use or omission of inverted commas :

He said " what is the shortest way back.

"So must I," answered the falcon. But who thinks of bringing me a good turn, etc. The mistakes of the use of a singular subject with a plural verb and *vice versa* are occasioned by the pupils' ignorance of the grammar. Such mistakes generally occur in the lower classes, *e.g.*, The fairy touch the mouse with her wand. Bird sings. Robinson Crusoe get to sea, etc.

(e) Wrong use of idioms :

A boy who was too strong carried the gun. The place of Panipat is widespread, etc.

These include the wrong use of articles, prepositions, numbers and punctuation and are very common in the lower and middle classes :

#### *Other Common Mistakes.*

(C. V.) The two sister did not know Cindrella. A germ is an tiny animal It turned into a prancing the horse. Sohan was playing.

(C. VIII.) A few week ago. They conducted themself.

#### *Possible Methods of avoiding such Mistakes.*

(1) It is psychologically proved that auditory impressions and motor activities play an important part in the acquisition of any skill. Hence it is essential that the child should be surrounded with an atmosphere of hearing and articulation of correct English in school. To avoid wrong

impressions the teacher should be very careful about his own English and pronunciation.

(2) He should inspire his pupils with a strong desire to speak English during the English period.

(3) Let the pupils learn certain good extracts and poems by heart, from their text-books.

(4) The words used by the teacher before the class should be on the pupils' plane of comprehension.

(5) The repetition of the same mistakes over and over again shows that pupils do not go through what the teacher has corrected. So we should try to make it a habit with the pupils that they read once or twice their corrected exercises.

(6) It would be a better plan if the teacher explains all the possible mistakes to the class before he asks his pupils to write out an exercise in composition.

(7) Difficult words which the teacher thinks the pupils will spell wrongly, may be written on the b.b. and left there for further reference during the period.

(8) We should occasionally give practice to our pupils in the translation from the foreign into the mother-tongue to test whether the right impressions have been formed.

## II. ERRORS IN ARITHMETIC

### (1) *Types of Error.*

The errors generally noticed in the work of Arithmetic can be classified under the following headings:—(1) misconception, (2) wrong form, (3) wrong use of signs, (4) defective language. The cause of the errors has been traced out as far as possible by looking at the nature of the mistakes

and the remedy against such mistakes is suggested according to the possible causes and the origin of the mistakes. We had the opportunity of observing the oral as well as the written work of classes up to the 8th standard for a few weeks only.

*Misconception.*—To the question, "What is area or volume," the pupils reply, "area is equal to length into breadth," and "volume is equal to length  $\times$  breadth  $\times$  height," which is not quite right.

In percentage we find;

$$3\frac{1}{3}\% \text{ of Rs. } 50 = \frac{10}{3} \times \frac{1}{100} \times 50 = \frac{5}{3}$$

$$77 \text{ yds. of a mile} = \frac{7}{80} \times 100 \text{ miles} = 4\frac{3}{8} \text{ miles};$$

$$\text{लड़कों की संख्या} = 120 - 18 = 102 \text{ per cent. etc.}$$

There are similar mistakes in Classes V, IV and III; e.g.

$$\text{Rs. } 427.28 \div 100 = 4.2728;$$

$$\frac{\text{Rs. } 1 \text{ 5 as.}}{\text{Rs. } 5 \text{ 4 as.}} = \frac{21 \text{ as.}}{84 \text{ as.}} = \frac{1}{4} \text{ a.; } 3\frac{1}{3} \text{ mds.} \div \frac{2}{4} \text{ mds.} = \frac{1}{1}\frac{2}{3} \text{ mds.}$$

The above examples show that the pupils' conceptions about concrete quantities and abstract numbers are not clear.

In finding the complete remainder in the division by factors :

$$135 = 9 \times 5 \times 3.$$

$$\begin{array}{r} 9 \overline{) 4879} \\ 5 \overline{) 542 \text{ } 1} \\ 3 \overline{) 108 \text{ } 2} \\ \hline 36 \text{ } 0 \end{array}$$

$$\begin{aligned} \text{The remainder} &= 0 \times 3 + 2 = 2 \\ &2 \times 5 + 1 = 11 \\ &11 \times 9 = 99 \end{aligned}$$

The following work exhibits the fact that the pupils do not have clear notions of the place value of the figures. In

oral work the pupils cannot find out approximately by inspection or guess work the number of digits in the square root and in the quotient in connection with the division of simple and decimal fractions.

Addition, subtraction and multiplication of decimal fractions

$\begin{array}{r} 52.73 \\ \div 325 \\ \hline 49.48 \end{array}$	$\begin{array}{r} 39.57 \\ 43.221 \leftarrow \\ .209 \\ \hline 82.477 \end{array}$	$\begin{array}{r} 27.97 \\ 23 \\ \hline 55.94 \\ 3.391 \\ \hline 64.331 \end{array}$
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In unitary method and complex fractions—(significance of line).

∴ 6 persons cut 48 bighas in 4 days

∴ 1 person cut 1 bigha  $\frac{4}{6 \times 48}$  or  $\frac{6 \times 48}{4}$  days

$$\begin{array}{l} 4 \text{ men} = 6 \text{ women} \quad ; \quad 1 \times \frac{3}{4 - \frac{7}{2\frac{2}{5}}} = 1 \times \frac{3}{4 - \frac{7 \times 13}{5}} \\ 1 \text{ man} = 1\frac{1}{2} \text{ women} \end{array}$$

*Wrong forms.*—(1) area =  $50 \times 22$  sq. ft.; volume =  
(i)  $30 \text{ ft.} \times 25 \text{ ft.} \times 10 \text{ f.}$  (ii)  $30 \times 25 \times 10$  cu. ft.; (iii)  $30 \times 25 \times 10$   
or (iv)  $30 \times 25 \times 10 \text{ ft.} = 75$  cu. ft.

(2) Rs. 5 = Rs.  $5 \times 16 = 80$  as.

(3) 5 Rs.; 6L.; miles 41.25 एक घंटे की चाल

(4)  $1\frac{7}{20}$  of  $\frac{7}{4} \text{ of } \frac{2}{5} \times 1\frac{1}{4} \leftarrow$

(5) 6 cows = 20 sheep. (6) £1. 6s.; 11p =  $\frac{1}{12}$  p =  $6\frac{1}{12}$  p  
=  $\frac{8}{12} \times \frac{1}{20}$  s. etc.



*Wrong use of signs* :—(1) 6 persons 5 दिन में कमाते हैं = £०

(2)  $\frac{7}{8}$  हिस्से का मालिक था; (3) £1 का  $\frac{3}{4}$  =  $205 \div 4 = 58 \times 3 = 158$

$\rightarrow = \frac{7}{8}$  का  $\frac{2}{3} = \frac{7}{12}$  पुण्य किया; (4)  $\frac{11}{8}, \frac{11}{3}, \frac{44}{9}$  का L.C.M. =

$$\frac{33, 66, 88}{18} = \dots\dots$$

$$= \frac{7}{8} - \frac{7}{12} - \frac{7}{24} \text{ शेष}$$

Mds. s. ch.

$$(5) \quad 3 \overline{) 98} \quad 32 = 2 \text{ शेष } \uparrow \quad ; \quad 9 \overline{) \begin{matrix} 45 & 39 & 12 \\ 5 & 4 & 6 \end{matrix}} = 7 \text{ ch. बचे } \uparrow$$

$$(6) \quad \frac{8^9}{9} \div \frac{11}{9} = \frac{8^9}{9} \times \frac{11}{9}; \quad (7) \text{ Rs. 5 of } \frac{8}{9} \text{ (for Rs. 5 का } \frac{3}{5})$$

$$(8) \quad \frac{253}{10}$$

$$\frac{2530 \times 10 \text{ का गुणा}}{9}$$

$$22770 \times 90 \text{ का गुणा}$$

*Language defects* :—

(1) महाजन के एक टोपी पर मिलता है =  $\frac{1}{3} \frac{1}{3} \text{ रु०}$ ,

$\therefore$  15 लड़के एक काम को 12 दिन में करते हैं

$\therefore$  1 लड़का " " =  $15 \times 12$  " "

(1) तोला—3 मा०—4 रु० इतना सोने में एक अंगूठी बनती है.

$\therefore$  एक बक्स में 30 टोपी आती हैं

$\therefore$  कितने बक्सों में 360 टोपी रखी जावेगी  $\frac{360}{30}$  बक्स

(3) The word answer is found written at the end of the solution of each sum e.g. *Ans.* = Rs 25 or Rs 72 *ans.*

It is altogether objectionable because nobody, to the question "what is your name?" replies "My name is X Y Z name."

*Other minor defects:—*(1) Bad formation of figures commences from Class III and continues throughout the school.

(2) The pupils are habituated to over-writing which spoils the beauty of the work and accuracy suffers a good deal

(3) The work on the left page, different from that on the right, is found in a jumbled form and is of no use at the time of revision or for checking

(4) Much space is left blank in exercise books either for the completion or for the solution of the sums given for home work with the red remarks, "complete it; do it again?" etc. Economising of space is not taught at all.

## II. POSSIBLE CAUSES

We are not wrong if we attribute the blame for the occurrence of these mistakes to the teachers of Arithmetic. They may excuse themselves by pointing out carelessness on the part of the educands. But still they are at fault because it is they who do not form right habits in the pupils at the proper time

The teachers take too narrow a view of the subject and treat different topics as separate units and think that the efficiency attained in the particular topic is for its sake only. The important steps are not thoroughly impressed and all the topics are taken as equally important.

The learning of each new topic in Arithmetic depends on the mastery of the preceding steps but teachers do not realize this fact and hence do not give sufficient practice in the important phases of the basic topics

The teachers do not look deep into the subject to find out the general forms of the different topics which they should emphasise whenever they get the opportunity, e.g.,

place value of figures in the Arabic number system, the idea of unit at the time of comparison and measurement and the difference between abstract and concrete quantities.

Mechanical teaching of certain topics (*e.g.*, square root, finding complete remainder, etc.), is also the cause of some mistakes.

Teachers hurriedly drag the pupils to the mechanical work in the beginning of a new topic without allowing sufficient time for the consolidation of a new conception. The teachers want to finish the book prescribed by the authorities, and do not care to teach the pupils the subject in its true sense.

Much help is not taken from the outside world to make the subject real and practical, which helps the pupils to understand critical points vividly.

Some of the current text-books are responsible for the wrong forms but to a great extent the mistakes come in existence through the negligence of teachers who daily see the written work of the lower classes.

The mistakes of the signs are due to the ignorance of the pupils because they do not understand clearly what certain signs stand for and where they should be used, *e.g.*, that the sign " $=$ " stands for "To be equal to" and is like a fulcrum to keep equilibrium between the two sides.

The language mistakes occur owing to the pupils' incomplete knowledge of the vernacular and their imitative nature. They copy exactly the statement of the teachers who instead of reading the amount written on the black board, use generally the pronoun "इतना" and in reasoning "कितना".

The minor mistakes fall in the realm of habits, *e.g.*, tidiness, neatness, accuracy and carefulness, which are not

formed from the beginning and which take a serious turn in the later work.

### III. SUGGESTED REMEDY

The conception of the teacher about the topic before going to the class should be quite clear. He should keep his eyes over the whole subject so that he may find out how much importance should be attached to a certain phase of the topic or subject.

The important points which trouble our pupils very much throughout the work of Arithmetic should thoroughly be impressed. If the place value is properly taught in connection with number teaching the whole difficulty up to the contracted method of decimal is solved very easily

The teacher should teach the pupils the subject, Arithmetic, and not the book

Much oral and practical work in the beginning will save a lot of time later on and avoid many mistakes about conceptions.

The correction of the written work of pupils, and particularly of the lower class children, should be done carefully and bit by bit as soon as possible.

The corrected work should be accompanied by oral instructions and the teacher must see whether they are carried out properly

He should take great care to foster good habits in the pupils from the beginning and set and maintain his own example with deliberate care

### IV. CONCLUSION

Enough time and attention are not paid to the so-called 'small' things at the earlier stage, hence careless habits are formed which persist later on and create all sorts of defective situations.

## VII

### A SURVEY OF HIGH SCHOOL MARKS \*

In a public examination (like the High School Examination) four main considerations seem to guide all procedure, viz. :

- (a) The question paper, which serves as the stimulus.
- (b) The answer, which is the candidates' response to that stimulus.
- (c) The mark, which is the numerical evaluation of that response.
- (d) The arbitrary prescription of a minimum 'pass' mark as well as of second class, first class and 'distinction' marks.

The present survey aims at a statistical analysis of such High School Examination marks for 1928, 1929 and 1930 as have been made available to the writer through the kindness of the Board for the United Provinces, and, if possible, at drawing inferences for use in connexion with the improvement of the present examination system with special reference to consideration (d) above.

It is assumed that from year to year the question papers set in the various subjects and the marking of the answer-books have followed a uniform standard; in other words, that the examination marks of the different years have represented data of a similar nature. Otherwise the examination has

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\* Reprinted from *Teaching*, December, 1936.

no meaning. The candidates, being the product of the same kind of high school training and anxious to do their best, may fairly confidently be assumed to represent a homogeneous body whose performance, too, would be homogeneous and uniform from year to year. In fact, the variability lies in the process of evaluation of this performance, as has so pointedly been exposed in *An Examination of Examinations*. We shall see, however, that if the data collected from the records of the three examinations just mentioned are fairly and truly representative of their kind, the High School Examination of the United Provinces has maintained, in spite of the shortcomings inseparable from an arbitrary system, a fairly constant or uniform level or standard, unless we are to assume that all the numerical data and processes involved in the compilation of the results have been deliberately manipulated year after year. I, at least, am not prepared to make this sort of assumption.

### *Analysis of the Data*

(a) *S.L.C. Marks of 1919* The marks secured by 2,357 candidates were analysed at the Statistical Laboratory, Calcutta, and the frequency constants given in Table I were arrived at.

*Table I*

	English	Mathematics	Vernacular	History and Geography
Mean ..	40	48	54	40
Standard Deviation	11	17	10	11

### REMARKS

- (1) I have used the figures as whole numbers.
- (2) All the vernaculars were taken together.
- (3) History and Geography were in those days considered as one subject.

Table II

Subject		Year	N.	M.	S.D.
English	...	{	1928	1,008	35.6
			1929	1,006	37.4
			1930	1,011	37.2
Mathematics	...	{	1928	1,008	43.5
			1929	1,008	48.2
			1930	995	49.1
Urdu	...	{	1928	513	43.3
			1929	518	44.0
			1930	515	39.5
Hindi	...	{	1928	515	46.4
			1929	482	43.4
			1930	518	47.9
History	...	{	1928	515	38.0
			1929	512	40.1
			1930	515	37.8
Geography	...	{	1928	491	42.6
			1929	522	42.9
			1930	499	41.0
<hr/>					
Grand Total	...	{	1928	1,007	41.2
			1929	1,005	42.7
			1930	1,006	42.1

All marks are reduced to a percentage basis.

N=Number of marks analysed.

M=Arithmetical Mean.

S.D.=Standard Deviation.

In their detailed analysis Professors P. C. Mahalanobis and K. N. Chakraverty pointed to a large number of interesting conclusions, among which the most thought-provoking was that about the desirability of having 'equivalent' pass marks on the basis of the mean marks and standard deviations in different subjects.<sup>1</sup>

(b) *High School Examination Marks for 1928, 1929 and 1930.* About 1,000 marks in English and Mathematics and about 500 in Urdu, Hindi, History and Geography as well as the grand totals were considered for each year, and the means and standard deviations were calculated. (See Table II.)

At a glance one can see that the various figures for the three years for each subject are very nearly the same. Since  $M \pm S.D.$  represents the limits within which the middle 68 per cent, i.e. the 'average majority' of the marks, lie, we show these figures, in whole numbers, in Table III.

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<sup>1</sup> The Indian Journal of Statistics, August, 1934.



Table III

Subject	Year	M. + S.D	M.—S.D.
English	1928	46	26
	1929	46	27
	1930	46	28
Mathematics	1928	59	29
	1929	63	33
	1930	64	34
Urdu	1928	54	32
	1929	54	33
	1930	48	31
Hindi	1928	55	38
	1929	51	35
	1930	55	39
History	1928	48	28
	1929	50	30
	1930	45	31
Geography	1928	52	33
	1929	51	34
	1930	50	32
<hr/>			
Grand Total	1928	49	33
	1929	51	34
	1930	50	34

From this table it is evident that the average 68 per cent of the candidates have continued to show, for all the three years, fairly common characteristics as a group, for the range within which their marks lie shows very nearly the same upper and lower limits each year. Moreover, these

limits compare very favourably with the random study of the S.L.C. marks already referred to, indicating that these figures may, with a reasonable degree of accuracy, be assumed to represent the provincial standard of achievement of the High School Examination population. In the absence of further data, therefore we can, as a tentative measure, assume that the average of each item for three years constitutes the standard for the province. These averages are shown in Table IV (Provincial Standards).

*Table IV*

Subject		Mean	Standard Deviation
English		37	10
Mathematics	...	47	15
Urdu	...	42	10
Hindi	..	46	8
History	...	39	9
Geography	...	42	9
Grand Total	...	42	8

This table means that, with an arbitrary 33 per cent prescribed as minimum 'pass' marks in the various subjects the average majority (or middle 63 per cent) of the candidates appearing at the High School Examination should secure marks between 47 and 27 in English, 52 and 32 in Mathematics, 52 and 32 in Urdu, 54 and 38 in Hindi, 48

and 30 in History, 51 and 33 in Geography and 50 and 34 in the Grand Total. These upper and lower limits of marks secured (or to be secured) by the average majority of the whole group will certainly change by two or three marks if data from a much larger number of years, say ten or twelve, are considered with the same object, but the study irresistibly points to some important observations, viz.

1. The average marks are different in different subjects in spite of the prescription of 33 per cent as the minimum 'pass' standard. But they are almost the same in the same subject from year to year.

This fact should warn us against using this arbitrary standard as an absolute line of demarcation between passes and failures. It should be considered only as an arbitrary starting-point, and the actual results as 'passes' and 'failures' should be decided on the basis of the achievements of the 'average' group, i.e. in the light of the  $M. \pm S.D.$  figures

2. Those who fall below the standard of this average group, i.e. secure marks less than  $M.-S.D.$ , can justly be declared as failures ; while those who get marks more than  $M. + S.D.$  can be assumed 'to be of superior attainments. But the matter is not so simple as it appears, for a number of subjects as well as the grand totals are concerned in the compilation of the final results. The line of demarcation between passes and failures, however, is very clearly laid down by the figure  $M.-S.D.$  in each subject and for the grand total.

3. After the results have been classified as superior average' and 'failures' in this way, it will be necessary to scrutinize the border-line case, i.e. those lying within a few

marks of  $M. + S.D$  and those lying between 33 per cent and  $M.-S.D$ . It is quite likely that some cases lying between 33 per cent and  $M.-S.D$ . will have to be failed, and that cases within a few marks of  $M. + S.D$  will have to change positions. But this matter is beyond the scope of this paper; mathematical analysis does not dictate to, although it scrutinizes the work of, the educationist.

While I press the claims of the quantity  $M. \pm S.D$ . for consideration and adoption as the guiding formula for the classification of examination results, I am not unconscious of the limitations of the data discussed in this paper. My own analysis has been somewhat general, and I have not included other matters, particularly the correlations, in my discussion. High School Examination marks for ten, twelve or more consecutive years should be analysed and compared, and the results, tabulated in the manner indicated in this paper, compared with similar results obtained from as many individual schools as possible, before a reliable 'provincial' standard can be accepted even as a tentative measure.

But will the examining bodies realize the need for an investigation with a view to discovering such a standard?

## VIII

### MARKING OF ANSWERS IN ARITHMETIC AND ALGEBRA

In June 1934 I was requested to conduct a refresher course for teachers of mathematics employed in Anglo-vernacular Schools in the U.P. The course was organised by the U. P. Secondary Education Association and was held at the D. A. V. College, Dehra Dun. During this course the following experiment was arranged to give the teachers a practical insight into what they exactly do while marking answer-books in Arithmetic and Algebra.

I set a question-paper of the usual type suitable for Class VIII of A. V. schools, which marks the end of the 'Middle' stage and leads on to the 'High School' or 'Matriculation' stage, and got two school boys of Dehra Dun,—one good boy and another an 'ordinary' boy, selected as such by a teacher of the place from among his own students,—to answer the paper. The answer-books of these two boys were marked A and B respectively before being handed over to the examiners.

The examiners included both men and women, graduates as well as undergraduates, all trained and experienced and employed in Govt. and aided institutions. The following instructions were issued for their guidance:—

They were not to award marks anywhere inside the answer-books but only make entries in the following form:—

Qn. No.	Full marks allotted to each question.	Marks deducted	Reasons for deducting marks.	Marks allotted to each answer.
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I. (a)

(b)

etc.

The whole paper carried 50 marks but examiners were at liberty to allot full marks to each question before proceeding to mark the answers. They could take their own time over each answer-book but were not to consult one answer or divulge their marks to anybody.

Within the period of eight days not more than 14 teachers could finish the marking when I had to stop the work in order to discuss the data and the conclusions before the whole class.

The astounding varieties and diversities in the marking will be evident from the following tables.

### The Question Paper.

#### ANNUAL EXAMINATION

#### CLASS VIII

Time—3 hours.

Full Marks—50.

1. (a) Simplify:—

$$\frac{2\frac{1}{3} \times \frac{3}{14} - 5\frac{1}{2} \div 16\frac{1}{2}}{16\frac{1}{2} - (5\frac{1}{2} - \frac{3}{14}) + 2\frac{1}{3}}$$

(b) Find the number less than 1000 which, when divided by 18, 20, 15, 45 or 24 will leave the remainder 5 in every case.

2. A man's income is increased by Rs. 400, but the income-tax being reduced from 5% to 4% in the rupee he pays the same amount of tax in both the cases. What is his income?

3. A can do a piece of work in 14 days and B in 21 days. They begin together. But 3 days before the completion of the work, A leaves off. In how many days is the work completed?

4. The length of a room is double the breadth; the cost of colouring the ceiling at  $4\frac{1}{2}$ d. per sq. yd. is £2 12s. 1d. and the cost of painting the 4 walls at 2s. 4d. per sq. yd. is £35. Find the height of the room.

5. A sum of money amounts to £550 when the rate is 4% and the time  $2\frac{1}{2}$  yrs. What would be the amount if the rate were  $4\frac{1}{2}$ % and time  $3\frac{1}{2}$  yrs.?

6. If  $a = 3$ ,  $b = 4$ , and  $c = 5$ ,

(i) Distinguish between  $3\frac{4}{5}$  and  $a\frac{b}{c}$ .

(ii) Express the number 345 in terms of  $a$ ,  $b$  and  $c$ .

7. Solve:—

$$(a) 0.375x - 1.875 = 0.12x + 1.185.$$

$$(b) \frac{5}{x} - 2y = 9; \quad \frac{3}{x} + 4y = 8.$$

8. The sum of the two digits of a number is 7 and if 27 be added to the number the digits are reversed. Find the number.

9. Draw the graphs of the following:—

$$x=5, y=9, x+y=18.$$





*Observations.—*

1. There is one examiner (no. 6) whose allotment of marks falls away from the general pattern.

2. In certain questions the allotment of marks is fairly uniform, *e.g.*, in Qns no. IV, V, VII (a) and VII (b). The first two are problems in Arithmetic of a set nature and the last two are equations in Algebra, also accepted by teachers generally as of a 'proper' type.

3. The allotment of marks in Qns no. II and III, which are also problems in Arithmetic of the usual variety, is also uniform. The variation would be reduced were it not for examiner no. 6.

4. The examiners show great variety in their assessment of the importance of Qns. no. I (a) and (b), VIII and IX, which are respectively a simplification in Arithmetic, an easy number problem in Arithmetic, a problem in Algebra and a question on graphs.

5. The variation in the allotment of marks to Qns. no. VI (a) and (b) is remarkable. It is evident that this is due to the nature of the question (a sum on algebraic symbolism) being rather unusual.

It is easy to infer that the allotment of marks by different examiners is fairly uniform to the extent the questions are of an usual routine type,—a type which has come down from time immemorial.

Table II

Marks awarded to answers (Book A)

Qn. No.	2½	1½	2½	3	2	3½	2½	2½	2	3	3	1½	2	1½	Range.
I (a)	2½	1½	2½	0	0	0	0	0	0	0	0	0	0	0	1½ to 3½
(b)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
II	5	6	4	5	5	5	5	5	5	5	5	5	5	5	2 to 6
III	0	0	4½	0	0	0	0	0	0	0	0	0	0	0	0 to 5½
IV	2	0	1½	1	6	0	2½	2	1	1	1	0	1	0	0 to 6
V	5	5	4½	5	5	4½	5	5	4	5	5	2	4	5	4 to 6
VI (a)	2	2	2½	3	1	0	2½	4	5	2	2	2	2½	2	0 to 3
(b)	2	2	2	3	1	4	2½	4	5	2	2	1	3	2	1 to 4
VII (a)	2½	2	2½	3	2	3	2½	4	5½	2	2	1½	2½	2½	1½ to 3
(b)	2½	2½	5½	2½	3	3	2	4	5½	2½	2½	3	3	2½	2½ to 3
VIII	5	5	Omission	4½	5	4	3	4	5	5	5	3	5	6	3 to 6
IX	4½	6	6½	4	7	3	4½	2½	5½	2	4	5	5	4	2 to 7
Total	33	32	31½	32	31	31	35½	29	32½	35	37½	27	32½	30	

Range—27 to 37½

### *Observations.*

1. The widest range of marking is in the case of problems in Arithmetic, in Questions No. II, III, and IV.

In the case of a correct answer when a mark or so has been deducted, the reason usually given is, "figure and symbols written carelessly" or "wrong expression." Only one or two examiners state their reasons fully or carefully.

In the case of a correct answer, when marks assigned are low, the reason given indicates that the examiner is not clear about his own standards. One examiner (No 6) gives the reason for deducting a large number of marks in Question II as 'The mode of writing does not express what he has in mind.' Indeed, the examiner's own mode does not indicate what he himself has in his mind.

In the case of an incorrect answer in these problems, wherever marks have been awarded, it is due to the examiner giving partial credit to the pupil's attempt,—a very vague consideration.

2. Questions No. I (a) and (b), VI (a) and (b), VII (a) and (b) are marked fairly uniformly except for examiner No. 6, who increases the range of markings by his arbitrary allotment of maximum marks. Moreover, his reasons for deducting marks are vague and careless, viz. in Question No. VI (a) where he allots no marks for a "not clear" reason.

3. The reasons for deducting marks in Question No. IX on Graphs vary from "not writing the scale properly" to "want of cleanliness and order."

Table III

Marks awarded to answers (Book B)

Qn. No.	Range.												
I (a)	$2\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{3}{4}$	3	2	$3\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	4	3	$3\frac{1}{2}$	2	$1\frac{1}{2}$ to $3\frac{1}{2}$
(b)													
II	2	2	$1\frac{1}{2}$	1	2	$1\frac{1}{2}$	1	$2\frac{1}{2}$	0	0	0	$1\frac{1}{2}$	$1$ to $2\frac{1}{2}$
III	0	0	0	0	0	0	1	0	0	0	0	0	0 to 1
IV	0	1	0	0	0	$\frac{3}{4}$	1	0	0	0	1	0	—
V	0	0	0	0	0	0	0	0	0	0	0	0	—
VI (a)	0	0	1	0	0	0	$\frac{1}{2}$	1	1	1	4	1	0 to 1
(b)													
VII (a)	2	2	2	3	1	4	3	$2\frac{1}{2}$	$2\frac{1}{2}$	2	1	3	1 to 4
(b)													
VII (a)	0	0	0	0	0	1	2	0	0	0	0	0	0 to 2
(b)													
VIII	2	3	$2\frac{1}{2}$	2	4	$3\frac{1}{2}$	2	$2\frac{1}{2}$	$2\frac{1}{2}$	3	$2\frac{1}{2}$	$2\frac{1}{2}$	2 to 4
IX	5	$2\frac{3}{4}$	5	4	3	$4\frac{1}{2}$	3	4	6	5	6	$5\frac{1}{2}$	$2\frac{1}{2}$ to 6
Total	$4\frac{1}{2}$	4	$4\frac{1}{2}$	3	6	3	4	$2\frac{1}{2}$	$5\frac{1}{2}$	2	5	4	2 to 6
	18	17	$19\frac{1}{2}$	16	18	$21\frac{1}{2}$	19	15	$21\frac{1}{2}$	18	18	$19\frac{1}{2}$	18
	Range—15 to $21\frac{1}{2}$												

Range—15 to  $21\frac{1}{2}$

### *Observations.*

1. There is practically no variation in assigning marks to inaccurate answers.

2. In the case of correct answers the deduction of marks has been mostly on grounds of untidy work and lack of clear expressions. Different examiners have a varying standard of assessing these shortcomings, but, in general, there are not very violent fluctuations in this respect.

It must be noted, however, that the sum total of small deductions affects the aggregate, with the result that mathematical and non-mathematical requirements, not being clear in the minds of the examiners produce a judgment which is far from being a reliable index of a candidate's ability in mathematics.

### *General Conclusion.*

It may be concluded that the large variation in the marks awarded to the same paper may be assigned to three factors :—

1. Initial erratic allotment of maximum marks to different questions which constitute the whole paper,—an indication of the examiner's ignorance of the relative value of each question in relation to the whole paper.

2. Descriptive steps involved in certain questions, which lend themselves to different assessments,

3. Ignorance of examiners in such an important matter as the relative merits of mathematical and non-mathematical considerations, leading to vague ideas and erroneous standards both in teaching and in examination.

4. It may be interesting to find out what individual differences are concealed behind the total marks, *e g.*, where 18 marks are awarded to Book B by six examiners, although they award different marks to different questions.

## IX

# A STUDY OF SCHOLAR'S REGISTERS IN A.-V. SCHOOLS IN THE U. P.

The figures in the following tables are reprinted from the Sixth Annual Bulletin of the Agra Training College (1937). They were collected by my friend and colleague, Pt. Mohan Lal Misra, from data furnished by institutions, as follows :—

Kind of Institution.	No. of students on Roll in Class III in September, 1925
1. Govt. (16)	1. 615
2. Aided. (40)	2. 1253
3. Total (56)	3. 1868

Each of these tables shows, in its own telling way, that a policy of drift pervades our schools and leads to terrible wastage of time, energy and money through the evils of stagnation and migration.

*Table I*

Showing the extent of migration and consequent waste in education.

	No. of students of this group who continued in the same institution till they passed the High School Examination.	No. of students who left the original institution before passing the High School Examination and took their transfer certificates.	No. of students who were reading in the original institutions in 1937.		Casualties.
1.	151	244	205	12	3
2.	157	421	651	17	7
3.	308	665	856	29	10

It is clear that while 25% of the students continue their studies from Class III to X in Government Schools, only 12½% do so in Aided Schools, and that, while 33% leave Government institutions without taking their transfer certificates, 52% do so in the case of the aided ones. How respectable or respected are these schools !

*Table II*

Showing the scatter, in successive years, of the students of the original group over the various classes.

	No. of students who passed from the same institutions							
	III	IV	V	VI	VII	VIII	IX	X
1.	522	460	390	340	281	235	192	151
2.	936	735	572	459	374	282	213	157
3.	1458	1195	962	799	655	517	405	308

The story of the aided institutions is sad indeed ! The next table which is really complementary to Table II explains this sad story more clearly and effectively.

*Table III*

	No. of students of the original group who dropped off in class								No. of students still reading.	No. of students who passed the H. S. Exam
	III	IV	V	VI	VII	VIII	IX	X		
1.	93	62	70	50	59	46	42	30	12	151
2.	317	201	163	113	85	92	62	45	18	157
3.	410	263	233	163	144	138	104	75	30	308

*Table IV (a)*

Showing the progress of those students of the original group who passed the High School Examination from the original institutions.

	No. of students who passed the H. S. Exam	No. of students who finished the prescribed 8 years course in				No. of those who are still reading and who will take 12 years or more.
		8 years.	9 years	10 yrs.	11 yrs	
1	151	62	52	27	10	12
2	157	60	61	28	8	17
3	308	122	113	55	18	29



*Table IV (b)*

Showing the progress of those students of the original group who passed Class VIII from the original institutions.

	No. of students who passed Cl. VIII	. of students who finished the prescribed 6 years' Course in					
		6 years	7 years	8 years	9 years	10 years	11 years or more.
1	235	130	64	30	7	3	1
2	282	140	72	42	23	4	1
3	517	270	136	72	30	7	2

The importance of these two tables can hardly be over-emphasised. Has the terrible wastage due to stagnation, as revealed by these figures, ever been noticed by anybody? It is worth while finding out at what stage or stages is the stagnation greatest and also the reasons thereof. It must also be found out whether it is due to unsuitable courses of study or to faulty teaching or to positive neglect of the students on the part of the headmaster and teachers during an important psychological period.

*Table V*

Showing the distribution of students who left the original institutions before passing the H. S. Examination and did not take their transfer certificates and hence can be presumed to have given up their studies altogether.

	No. of students who left from class								Total
	III	IV	V	VI	VII	VIII	IX	X	
1	55	31	34	19	18	23	17	8	205
2	232	119	98	61	50	41	27	23	651
3	287	150	132	80	68	64	44	31	856

Is it not worth while finding out why about half the total number of school students in Class III are compelled to cut off all connection with education during the subsequent years of their school life ? I beg most seriously to suggest that the Education Department should call upon all Inspectors of Schools to prepare, as a compulsory annual duty, tables like the above, with a view to keeping a record of the annual wastage in education in the province due to migration and stagnation in the different Educational Circles.



## PART II



## INTRODUCTORY

1. The Report of the Indian Universities Commission, 1902, contains the view of the Commissioners that it was "beyond doubt that the greatest evil from which the system of university education in India suffers is that teaching is subordinated to examination, and not examination to teaching." (p. 43)

2. The Government of India resolution on educational policy of 1904 says,

"In recent years they (examinations) have grown to extravagant dimensions and their influence has been allowed to dominate the whole system of education in India, with the result that instruction is confined within the rigid framework of prescribed courses, that all forms of training which do not admit of being tested by written examinations are liable to be neglected, and that teachers and pupils are tempted to concentrate their energies not so much upon genuine study as upon the questions likely to be set by the examiners."

3. The Calcutta University Commission, 1917-19, says,

"It is impossible to peruse the evidence, on the examination system as it exists to-day in Bengal without a feeling of profound sadness. The

immensity of effort, disproportionate to the results; the painful anxiety of the candidates; the mechanical award of marks encouraging the least fruitful efforts of the mind; a leniency sometimes neglecting the grave responsibility of the University to the public and tending to class the less with the more deserving students; the number of failures in spite of that leniency; the sterilising influence of the whole system on both teachers and taught, and the consequent crying waste of the intelligence of the youth of Bengal; these are evils which have been brought home to us by the most convincing evidence from witnesses of every section of the community, as well as by what we ourselves have seen. These evils can only be eradicated by resolute and determined reform."

(Vol. II. Pt. I, pp. 224-5)

4. Professor Amaranatha Jha in course of his presidential address delivered before the Examination Section of the 13th All-India Education Conference held at Calcutta during Christmas, 1937, observed,

"Should the examination be mainly a paper examination? Should all school examinations be on strictly academical lines? And should there be no contact between the mysterious shadow of the examiner and the pupil trying to satisfy his demands from a distance? How are character, physical fitness, cleanliness, record of social service, healthy instincts, to be appraised? The

obvious answer is, *trust the teacher more*. The testimony of the teachers should carry more weight. The present system is satisfactory up to a point for testing scholarship ; but the whole man—a compound of memory, intelligence, emotion, physical and moral qualities—needs a modified test....

In so far as examinations are a machine, it is natural that there should be dissatisfaction with their tyranny. What is required is the introduction into them of the human element. Man must not yield to this instrument of his creation his independence of judgment. He should make it an effective servant, not an inexorable master. Above everything else, the teacher and the educator must ceaselessly assert his superiority over the mere examiner."

5. The Zakir Husain Report, 1938 makes the following statement :—

"The system of examinations prevailing in our country has proved a curse to education. A bad system of education has, if possible, been made worse by awarding to examinations a place out of all proportion to their utility. As a measure of the work of individual pupils or the schools by a consensus of expert opinion, examinations are neither valid nor complete. They are inadequate and unreliable, capricious and arbitrary. We shall take care to guard against their baneful influence.



The purpose of the examination can be served by an administrative check of the work of the schools in a prescribed area, by a sample measurement of the attainment of selected groups of students conducted by the inspectors of the Education Board. The tests so administered should be constructed in close consultation with the specialists responsible for curriculum revision. They should be long enough to cover the whole range of curriculum and should be in a form which makes marking objective and independent of individual judgment."

6. The Report of the Primary and Secondary Education Reorganisation Committee, U.P., 1939, contains the following observations :—

"The frequency of examinations and the manner of conducting them exercises an adverse effect upon the aims and methods of education. An unhealthy and forced concentration upon memorisation of facts and isolated bits of knowledge prevents the development of sound judgment and organic view of things. Under the strain of examinations students are left with little opportunity to think for themselves or to follow out the ideas which arise in their minds. Thus their individuality remains undeveloped. Both teaching and learning tend to become mechanical and even the curricula and courses are drawn up more to suit the purposes of examinations than educational needs. Examinations tend to create among students the evil habit of neglecting work during the course of the session

and of concentrating on it right at the end. They are injurious to the health of pupils and lead to over-strain. Individual differences are ignored and it is not possible through the traditional type of examination to discover the different types and ranges of ability for which education has now to be provided.

“In fact it is notorious that the marking of examinations is largely unreliable and that the examinations themselves do not furnish an adequate measure of the achievements of pupils. The element of chance is always present in the examinations in a large degree. The standards which examiners adopt are mainly subjective and, therefore, liable to great variation from person to person and year to year. In the case of even the same examiner it is not possible to maintain the standard of uniformity...”

—(Ch. IX, pp. 87-88).

7, For the last several years the New Education Fellowship, through its International Institute Examinations Enquiry Committee, has been making valuable and striking contribution towards the reform of public examinations in most of the civilised countries of the world. I offer no apology for quoting some extracts from the reports of the World Conference of this Fellowship:—

- (1) “Many existing educational systems regulate the activities of the normal pupils by the needs of

those who may hope ultimately to specialise in the study of a few academical subjects. Examinations usually have been devised to set or to improve academic standards with the result that courses have become more intensive and at the same time more narrow. General education involves a perception of the interrelationship between subjects which academic examinations actively discourage. The premature specialisation to which they often lead is destructive of broad understanding. Thus even to the able pupil the intensive but restricted study which they suggest is harmful. With regard to pupils of less ability we have in all civilisations multitudes of those young people engaged in tasks for which they are not really equipped.

"Further.....the academicism and narrowness of our system has been imposed on non-European nations and races with calamitous results. The evidence Dr. Rugg has adduced from the Phillipines is comparable with that received from India and Africa at the British Commonwealth Education Conference, and *examinations appear to have been the means whereby those false standards have been imposed.* The books available to these pupils have been designed for examination use and are occidental in their contents and outlook, ignoring native conditions, native traditions, and native habits of thought.

"It is to be feared that even in the West the curriculum shows a similar disregard for essential

realities. The examination system of most countries has hitherto been of conservative influence tending to the retention of primitive conceptions of education." (Nice, 1932)

- (2) "Oppressive examinations and rigid curricula are the attempt of society to obtain a guaranteed product in the face of large numbers and a huge machine, but you cannot play for safety in education. Every advance is here gained by the creative acts of free individuals. Every way out of the present tangle leads in some measure to a loosening of the bonds, to experiment and therefore uncertainty, to elasticity and therefore variation, to trust and therefore risk. An educational system can be made to a considerable extent failure-proof in turning out a product that comes up to certain minimum specifications, but that product will not be the wise and cultured personality we seek, but a standardised human being without the initiative or individuality which constitute the salt of human life. Let us therefore turn our backs on such a method of controlling the free spirit of education and run instead the risk employed in trusting those we have made responsible for class teaching...

"The use of the same examination for a variety of incompatible purposes, such as assessment of ability, determination of attainment, selection of the specially gifted, and control of curriculum and teachers, is a system productive of grave confusion

and harm as long as external examinations are used as a chief means of evaluating schools and pupils in that they will lead to deplorable over-emphasis upon the more external and easily examined parts of the curriculum together with a neglect of those less easily assessed and ignoring of creative and social activities and gifts, besides attending to stereotyped curriculum and methods. The present examination system is a handicap to the normal progress and development of education throughout the world.

"The opinion seems greatly to be growing that externally imposed examinations should be abolished and their place taken by a system of record-keeping and internal examinations, which maintain standards and make for uniformity where such is desirable while allowing to each school and teacher freedom\* for invention and experiment—a freedom which is essential if schools are to be living entities and education a cultural process. This system of record-keeping, based upon an extension and elaboration of that already in vogue might finally cover the whole of a child's activity and interests, describing physical development and family history, enumerating special interests and hobbies and making some evaluation of creative and social activities. It should also record the percentages obtained of "intelligence," vocational and temperamental tests (and in all probability in certain achievement tests) as well as the results of internal

examinations and the teachers' estimates of past work."

(Report of the Enquiry Committee, 1935.)

8. Thus we see that not only in India but almost all over the world dissatisfaction has been expressed in responsible and authoritative quarters with the traditional system of examinations mainly for the reason that they have invariably dominated and cramped the curriculum and teaching. It is natural, therefore, to think of devising means for not only bringing our educational practice in a line with the best thoughts of the world but also for doing full justice to the Indian child from the point of view of his possibilities as well as limitations and pointing out to him the way of life to which he is destined by nature and may be entitled by nurture.

The real tragedy of the situation in India lies in the fact that the same complaints have been repeatedly recorded by responsible persons and bodies for at least half-a-century without anything being done to remove them. The Calcutta University Commission called for 'resolute and determined reform' in 1919 but there has been no effective or tangible reform of public examinations in any part of the country during two decades. Is this fatal impotence itself a glaring consequence of the deadening influence of examinations ?

## THE PROBLEM

9. It is rather unfortunate that the purpose of the High School Examination in the United Provinces is not defined anywhere. If we want to understand it we must draw upon prevalent tradition and usage.

10. The High School Certificate is the recognised minimum qualification for entry into government service and into different types of general, vocational and professional institutions. Hence it has a special value and importance of its own. This value has been acquired not through any virtue or merit inherent in the examination but really through a convenient supposition that, because it has taken the place of the now defunct Entrance, Matriculation or School Leaving Certificate Examinations, it has automatically inherited the advantage which those examinations were enjoying in their own days. The extensive widening of the scope of education and the complex needs of changed times have never been allowed to influence the structure and methods of this important examination.

There is, however, no doubt that a public examination is needed at the end of the school or "secondary" stage of education, to assess the quality and value of the training imparted during the previous six years or so, and to test the fitness of the pupil for further training or for the needs of life and livelihood.

11. But these are two distinct purposes, closely interrelated but not wholly interdependent, and, now

that the examination does not clearly indicate whether either or both of these purposes have been satisfactorily achieved, it is very necessary for the administration to state precisely what the aim or aims of the High School Examination will be in the coming order of things, *i.e.*, whether the High School (or the corresponding) Certificate will continue to remain a vague and uncertain index of a candidate's attainment as at present, or whether it will state his abilities, attainments, deficiencies and possibilities in a clear and comprehensive manner.

12. On this important question of the purpose of an examination the Calcutta University Commission has the following telling remarks to make :—

“The present confusion of the examination systems is largely due to uncertainty as to their purpose. It may be asked why universities are content with such confusions and uncertainty if we are right in thinking that they exist. The reply, in most cases, is simple. They are often concealed by the apparent definiteness and mathematical precision of the marking system. The university defines the percentage of marks which a candidate must obtain in order to succeed and if he obtains that percentage, why, it may be said, should any further questions be asked ? Ought not every one concerned to be satisfied ?

Yet it is clear that in order to convey any intelligible meaning to the general public, and even to an enlightened public, a minimum percentage of marks ought to be translatable into some form of words ; and it is unfortunately true that the



examining body would in most cases be hard put to it to give the translation. There is, as a rule, no want of good faith on the part of the examining body. It is itself deceived by the illusory appearance of certainty conveyed by figures to which it is nevertheless unable to attach any precise meaning."

(Vol. II, Ch. XVII, Paras 44 & 45)

13. Since teaching and examination are complementary processes it seems necessary here to point out some essentials of instruction before we can think of the machinery by which that instruction can be subjected to the process of testing.

14. Sir Percy Nunn, late Professor of Education at the London University and one of the greatest educational philosophers of modern times, explains the distinction between the various stages of education in the following words:—

"We now recognise, at least in principle, that "youth is the time for education," and that youth, even the youth of the poor, lasts until the age of eighteen. University education excluded, there are three educational periods corresponding to the three major waves of physical and mental growth. First, there is infancy merging into childhood between 6 and 8. This is the period for education in the home or the nursery school, where Froebel and Montessori should be the presiding deities. Next comes the wave of childhood, whose force is normally spent at the age not far from twelve. This should be for all children

the period for "primary education": that is, for a common scheme of instruction and training that meets the intellectual and moral needs of childhood and supplies the indispensable basis for the education of youth. Lastly, there is the wave which carries the boy or girl through adolescence to the dawning of manhood or womanhood about the age of eighteen. This marks out the period of "secondary education." The extension of this name to all forms of post-primary education is admittedly a violation of present usage, but is nevertheless highly desirable. For, it emphasises a fact whose full recognition would be one of the greatest of educational reforms; namely, that the problems of educating youth,—whether the youth of the aristocracy or the youth of the slums,—are but variants of a single problem, the problem of dealing fruitfully with a life-period whose central fact is adolescence."

*(Education : Its Data and First Principles.)*

15. Thus, the purpose of "secondary" schools is not merely to 'afford a higher general education' as defined in the Educational Code, U.P., but something more definite and tangible than what is implied in this vague statement. The Hadow Report (1927) of England calls it a 'realistic or practical bias' while the Hartog Committee's Report puts it as 'varied forms of training for life and employment suitable for the large number of boys of varied attainments and circumstances in the secondary stage.

16. Without going into the details of the theory of secondary education I may state that the period of secondary education, in order to fulfil the varied needs of the complex stage of adolescence, should be a period of training through *intense physical and mental activity in a carefully organised social environment*, so that, after 6 to 8 years of training of this kind, the pupil may be equipped to meet intelligently *any situation* which may fall to his lot when he leaves school. During this period he is not only to acquire knowledge of the kind he has so long been acquiring but also a mastery over his own physical, intellectual and emotional nature so that he may not be out of element in any novel situation.

17. *Knowledge and Skill.* Whenever we think of the purpose which dominates the practice of education in our schools and colleges we cannot but feel that it is at best narrow, meagre, thoughtless and almost unworthy, with hardly anything to do with the vital interests of the scholars' lives. Even the imparting of knowledge, of which so much has always been made, is, hardly anything more than the imparting of scrappy bits of information which are mostly forgotten as soon as the examination is over and which are seldom woven into a unified and permanent system of knowledge. In fact, hardly any emphasis is laid on the process by which knowledge is acquired and applied by pupils, with the result that their natural abilities are invariably left to themselves. What a poor attitude shown by the teachers towards the children placed under them !

18. If, however, teachers can be held responsible for this poverty of outlook with a consequent poverty of

education in their pupils, the blame is also to be shared by the curriculum-makers, who are completely swayed by examination considerations and nothing else. Teachers do what they are required or expected to do, and they would certainly continue to fail to do those things which are only vaguely expected of them. Memorised knowledge, being more tangible and more easily examinable than other educational results, has steadily come to occupy the most important place in our educational scheme. But the process by which all knowledge is acquired or applied,—all those *abilities* or *skills* which are at once the basis and product of education,—are seldom tackled consciously, deliberately and systematically by educators. They would certainly receive more attention if less emphasis were laid on information or knowledge which had already been acquired and hence had served its purpose, and greater importance attached to the children's ability to acquire new knowledge, to tackle new problems and to face new situations. It is this ability which should be the principal purpose of teachers to develop, and of examinations to test, in a sensible, systematic and scientific manner.

19. It is most unfortunate that the word "skill" is misunderstood in much the same way as the word "knowledge," for it is generally believed that subjects like the three R's and History and Geography impart "knowledge" whereas Drawing, Manual Training and other practical arts impart "skill" to the pupils. A little thought would show that the theoretical or informational subjects have a good deal of skill to impart,—the skill to speak and write in the most appropriate language, to think and

analyse facts, figures and events correctly, to command the intellectual processes in different situations, and so on; while the so-called practical subjects have a considerable amount of knowledge or information to impart to the learners. In fact, the two terms "knowledge" and "skill" can hardly be separated from each other during the process of education, and the curriculum-makers as well as teachers would do well to believe, and do better to act constantly in the belief, that the prescribed or suggested courses of study are to be used as the *means* for developing "skill," the term being used in a mechanical as well as intellectual sense, rather than promoting the retention of a body of disjointed and memorised knowledge in the children.

20 I now come back to the question of the purpose which the High School Examination should have clearly in view. If we clearly realise the two aspects of teaching just explained, *viz.*, "knowledge" and "skill," the conclusion would be irresistible that instead of examining knowledge it would be far better to examine skill in pupils so that their essential powers and real possibilities may be found out. It is well known that education in our secondary institutions has always suffered on account of teaching being cramped by means of prescribed curricula and text-books, teachers never being able to let themselves go and inspire their pupils with their own individual knowledge and intellectual qualities. Subjects like poetry, literature, history, hygiene, art and philosophy cannot be taught from the cultural or inspirational, or even an informational, point of view unless teachers are free to introduce their own individuality in their methods of instruction. If the knowledge elements

in such subjects are clearly separated from the skill elements with a clear understanding that, while the latter would be subjected to an outside examination in conformity to a certain standard, the former would be left to the teachers themselves so that they can bring in their own inspiration while teaching classes and influence them with their own knowledge and individuality, it will be a real gain to the country as a whole and to education in particular.

21. I wish also to suggest that a clear Educational Policy be enunciated by the local government, stating the purpose of education at each stage and the aims with which the public examination at the end of that stage, if any, should be conducted. It is most unfortunate that no such Policy seems to have been declared since the last Indian Educational Policy was published in 1913. It may be noted that the Reorganisation Committee, U. P., 1939, has also emphasised the need for such a Policy for giving a point and a direction to education in the province.

22. From another point of view it is necessary to define the purpose of the High School Examination. As explained at the outset the High School Certificate may mean a sort of judgment passed on the training received by its possessor during the previous six years or so, or it may mean a sort of declaration of his fitness for some future training or career. These, however, are two distinct aims. They could be mixed up in the past when the courses of study in our schools were limited by an academical outlook and all students in the normal course were expected to pass out into colleges. But now that the secondary school course has been widened and practical, aesthetic, industrial and physical considerations have led to the introduction of a large number of new subjects into the curriculum, it is no

longer possible or desirable for the same certificate to mean a large number of things even by implication. I make bold to suggest that this certificate should be stated to be a judgment passed on the candidate's previous training only and that the number of entries on it should be increased so as to include various types of information, *e.g.*, the abilities, aptitudes and limitations of the candidates, in addition to their attainments at one particular examination. Even then it should never be taken as qualifying the candidate for entrance into any particular type of institution or profession. It automatically means that arts, science, technical and professional colleges, and various employing agencies will have their own tests of fitness to be administered to candidates whom they want to admit or select.

Here I also suggest that, at the High School Examination, we should stop declaring "passes" and "failures" or awarding Divisions on the basis of the aggregate marks, for the present system conceals rather than express the strong and weak subjects of the candidates. All should go out into the world with a certificate showing the actual marks gained in the different subjects. This will be enough information for the subsequent employing agencies.

23. I do not know in how many civilised countries there is an Intermediate Examination midway between Matriculation and Graduation, but there is no doubt that the Intermediate Examination in India has always been used solely for the purpose of shutting out a large number of candidates from getting the benefit of higher education. There is a good deal of justification for substituting only one public examination at the end of the secondary stage of education for the two held at present, and this suggestion

is borne out by the recommendations of the Reorganisation Committee, U P. I do not quite agree that this reform should be introduced at once; it can come only when the entire high school population is enabled to get the benefit of a varied and comprehensive system of training right up to the present Intermediate stage,—a situation which this poor country cannot financially meet. Before this important reform is enforced there should be a period during which the schools should be equipped and trained so as to be able to test all their pupils with the object of eliminating in a sensible and satisfactory manner all those who are unfit and undeserving,—a task for which they are not prepared at present.

24. A middle course may be adopted by which the steadily increasing number of High School candidates can be kept within manageable dimensions. The following table clearly shows that about two-thirds of the total number of candidates appearing at the High School Examination from recognised institutions are lost to higher education commencing at the Intermediate stage:—

High School Exam. of	No. of school candidates appearing	Percentage of passes	Inter. Exam. of	No. of candi- dates appear- ing	Casualty
1933	9302	57.8	1935	3640	5662
1934	10485	66.6	1936	3768	6717
1935	10744	63.6	1937	3833	6911
1936	11327	55.7	1938	3973	7354
1937	11983	63.3	1939	4173	7810

If it is the function of this public High School Examination to maintain this two-thirds casualty year after year no



harm will be done if the educational institutions themselves are trusted to exercise this selective function. They may be required to conduct a fairly stiff and searching test examination in class X and declare passes and failures in this as in the other classes. If at all necessary, each recognised institution may be required to adopt the same question-paper and follow the same examination technique as the present High School examination, and, for the purpose of competition, send up a certain percentage of its scholars for a public scholarship examination. This system will relieve much of the mechanical pressure at present endured by the examining body without in any way affecting the standard of those who seek admission into higher institutions. Details aside, the time has come when our schools and colleges must be empowered to pass judgment on their own products not only at the end of every year but also at important stages and their judgment must be read side by side with the result of a single public examination conducted within its own limitations.

25. Since the result of a single public examination can never be a true or complete picture of a candidate's ability or attainment it is inevitable that the High School or any corresponding certificate should be accompanied by a comprehensive school record indicating the progress of the scholar from one end of the school to the other. The present Scholars' Register which is in use in the United Provinces is absolutely unsatisfactory from this point of view. Its form should be revised and widened so that place may be found on it for recording the scholar's progress from class to class in *all* those activities to which they and their teachers are required to devote time and attention at school. I have deliberately used the word 'activity' because,

in spite of the fact that a widened curriculum is required to be practised in our schools at the present time, teachers and students still continue to devote attention more to the examinable parts of subjects than to those parts which although extremely important from the educational point of view, are not easily amenable to examination. They also gravely neglect all those activities which cannot be subjected to any formal examination but which have been introduced with the sole object of training body, mind and character during the adolescent stage.

26. The following extract from a recent communication will show how progressive opinion in the west is emphasising the same idea :—

“That no departmental examinations be set in Art, Music, Vocational Subjects and English Literature, and that specimens of work or school records in these subjects, whichever is the most practicable in each case, be accepted from all schools for the purpose of the leaving certificate.

The essay-type examination papers be drastically remodelled, so that they may allow creative ability and independent judgment to be shown by the pupils; and that, whenever possible, the examination should require pupils to perform activities listed as desirable in the printed courses of study. To this end, we recommend the adoption of oral tests as part of the examinations in all modern languages, and the use of dictionaries, in foreign language examinations, text-books for at least part of social studies papers, and tables for scientific and mathematical papers. In science and English

composition we recommend that students be required at the time of the examination to submit, respectively, laboratory note-books and theme work done during the year.

That carefully constructed short-answer tests be used to a limited extent for subjects in which the possession of information, as such, and routine skill is to be encouraged.

That when internal examinations are accepted, the Departments give careful thought to the development of a school record card, on which the individual interests, personal characteristics, and other relevant data regarding the pupil may be entered in addition to the usual records of school work."

(International Bureau of Education : Press  
Communication 142/R.893, Geneva,  
November, 1937).

27. With such a comprehensive school record containing the considered opinions of almost all teachers of the school and the headmaster and available for reference at all times, it should be comparatively easy to make the High School Examination a far more simple and satisfactory affair than it is at the present time and a real 'administrative check on the work of the school' as suggested by Dr. Zakir Husain. It should also be noted that the Reorganisation Committee, U.P., 1939, has also emphasised the need and importance of school records in the following terms :—

"The use of cumulative records has, therefore, been recommended and cards are to be maintained on which is recorded all information derived from tests, examinations, marks, and details about his aptitudes and inclination, his physical condition,

his social and economic background, his character and whatever affects his personality. Such a cumulative record provides a true basis for making educational guidance effective."

(Ch. IX, para 12.)

28. Now we are in a position to suggest how the public examination at the end of the secondary stage can be simplified without minimising its efficiency. The whole curriculum should be considered as consisting of two parts, viz., (1) Examination subjects, and (2) Non-examination subjects, and, while the latter would be fully covered by comprehensive school records including clearly the amount of work done by individual scholars out of the work prescribed, the former would constitute the basis of the public examination, which shall arrange to test the 'skill element' in the various subjects rather than the 'knowledge element' which should only be used as the medium for testing the former.

Put in a different way the matter comes up to this. It is not necessary to have a public examination in any subject other than Language and Mathematics, unless fact or fancy requires a sort of General Knowledge paper to test information of an elusive nature and at best of secondary value at this stage of the scholars' lives. In the various languages, and certainly in the modern Indian languages and in English, written papers should be primarily concerned with the testing of comprehension of written (printed) matter and expression by means of writing and must be supplemented by an oral test. It is not necessary except in an indirect manner to try to test knowledge of poetry and literature or appreciation and criticism which are dominated by highly subjective considerations. In Mathematics the papers

should consist of a large number of simple questions to cover the entire course and unnecessary complicated problems and processes must be avoided. Standardised papers of the form used by Ballard and various American framers of attainment tests will be found to be quite adequate for satisfactorily testing the essential products of mathematical training.

I do not believe that public examinations are necessary at the High School stage in such subjects as History, Geography and Science; but, if they are to be held at all, the papers set should severely avoid expecting essay-form answers. They should invariably be of the standardised short-answer form so that a wide field of study can be covered by them. In all 'practical' subjects, as has already been suggested, a full school record clearly showing the amounts of work prescribed and actually done should suffice for all practical purposes.

29. If education as a normal function of a civilised social life has to command genuine respect and has to be accepted as a real living force it must allow more freedom to schools and show a more respectful consideration for their methods and judgments. The two main suggestions which have been made in the foregoing lines, *viz.*, (a) consideration of cumulative school records along with the High School certificate as a single record of judgment of the candidates' achievement up to the end of the secondary stage of education and (b) allowing schools to pass (and eliminate) a certain percentage of their scholars at the end of this stage, will, I honestly believe strengthen these educational institutions and raise them in public esteem. They will incidentally compel our schools either to prove worthy of the trust or be condemned at the door of public opinion.

## TECHNIQUE

30. We are so familiar with the details of our present system of examinations that we do not feel the need of asking such questions as "Why should a question-paper be set for three hours?" "Why should six questions for three hours be a sacred routine requirement?" "Why should the maximum marks in certain subjects be 100 while they are 150 or even 50 in others?" "Why should the minimum pass marks be 33% in all subjects?" and so on. Setting of papers and marking of answers together with such matters as tabulation of marks and calculation of the final results have become so rigidly standardised and every one has become so accustomed to the traditional practice that any suggestions for reform, however sensible, sound, and scientific they may be, are quite likely to be dismissed with a sneer. And yet the fact is that the system is almost disgraceful, being faulty, unscientific and unworthy of the noble purpose which it is intended to serve. Like all other educational practices our examination system is, in the inimitable words of Rusk, "a ritual or a superstition or a dodge."

31. Taking the case of our examiners first, there is no doubt that their performances with the candidates answers are highly subjective and hence liable to wide variation, with the inevitable result that their judgments are not reliable. This fact has been proved all over the world and need not be proved again. Personally I believe that it is useless to try to bring about what is called a uniformity

of standard among the various examiners in the same subject, because it is never possible to do so in a sensible manner and also because the differences of judgment shown by them are perhaps *educationally* more important and hence should be considered more seriously than the mechanical requirements of a rigid uniformity. It is our fault if we fail satisfactorily to convert human effort into numerical figures; and the fault is greater if, after giving some sort of numerical value to the candidates' performance, we fail to handle that numerical value in a sensible manner.

32. In these days when the science of statistics is accepted as the basis of all matters which depend on the manipulation of numerical data it is unthinkable that any teacher or examiner should be allowed to continue his educational work on the basis of examination marks without being properly equipped with an elementary knowledge of statistical methods. What is really required is much more than this elementary knowledge and the following words of Prof. Burt are worth the most serious attention in this connection :—

"Finally, I would venture to urge that every examiner should acquire, as part of his training, some *knowledge of the elementary statistical principles* involved in such work. Every examining body and every chairman of an examining board knows how each new member, fresh to his task, has slowly to pick up the requisite technique. There is a growing custom for preliminary instruction to be defined and set down on paper; and it would be a great advantage if the experience of expert examiners generally could be for-

mulated, systematised and recorded for the benefit of the novice. To be of real value, however, such instructions must, so far as possible, be couched in exact and quantitative terms. The art of examining, as of all forms of mental assessment and measurement, rests on scientific principles and involves a scientific technique; and this technique must, to a large extent, be statistical. Even so simple a task as combining marks for different questions cannot rightly be undertaken without a knowledge of what must occur when marks, more or less uncorrelated, are averaged or summed. Nor can a proper allocation of marks be made without some explicit theory as to the curve of distribution\* which the marks should approximately follow.

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For question-papers where the marking must largely turn on the subjective impressions of the examiner,—those requiring answers of the essay type, for example, there is no device which increases accuracy and comparability so effectively as the plan of defining marks and their relative frequencies in terms of a distribution curve. But when any suggestion to this effect is made, almost invariably the normal curve is put forward as the ideal; and critics, therefore, rightly object that, since most higher examinations are taken by a selected batch of candidates only, a normal curve must in theory be inapplicable. The proper reply is that, given adequate data, it is always possible to find a better fitting curve, e.g., by taking some form of hyper-geometric curve (of which the normal curve is only a limited case) or by adjusting the normal curve itself by means of a logarithmic scale. In practice, however, it is usually found that selection (no doubt because it is imperfect so) introduces very little asymmetry or distortion.



Again, examining authorities continually claim that the innovations which they have introduced must to a large extent eliminate the errors and uncertainties to which examinations in the past have been liable; but rarely if ever do they attempt a statistical experiment to verify how far the expected improvement has, in fact, been achieved. In the preceding pages I have limited my discussion solely to problems of consistency, *i.e.*, to the correlations of examiners among themselves. This must be the first step in all such inquiries. But it is equally essential to investigate the accuracy of the results as judged by some external criterion, *i.e.*, the correlation of marks with independent first-hand evidence as to the merits of the candidates in the particular field with which the examination is concerned. These two lines of inquiry are always followed in estimating value of any psychological test; and the same procedure should be adopted for every examination."

[*Marks of Examiners* by Hartog and Rhodes, Memorandum by C. Burt, para 603 (10).]

33. In statistics the importance of the two terms "Reliability" and "Validity" is well-known. The term "Reliability" has now been replaced by "Consistency" which designates the degree of agreement between any two independent sets of measurements of the same thing; while the term "Validity" stands for the agreement of the measurements with the things they are supposed to measure. Professor Burt's remarks quoted above clearly point to the

need for testing the *validity* and the *consistency* of examiners' marks before they are used for the purpose of passing judgment, but the fact is there that this essential step has always been missing in our examination procedure. Is it not a tragic story that the whole country has come to believe in, and rely on, examination marks the validity and consistency of which have never been tested and which, if actually tested, may have some terrible delusions to expose?

34 One great ignorance which our examiners have always shown, although unconsciously, is that of the fundamental differences existing in the nature of the various subjects, or, more correctly speaking, of groups of subjects. Perhaps they never discovered that this difference leads on to a remarkable difference in the nature of marks awarded to the candidates. For example, there are such subjects as Language or History in which the examiner can never award very high or very low marks; a candidate, provided he writes something in answer to a question, is sure to get some marks. But, in a subject like Mathematics if the distribution of marks gained by all the candidates appearing in a public examination is studied it will be found that the number of candidates securing very high or very low marks (even the full marks or no marks at all) is much larger than in the other subjects.

"It is possible for a candidate to get full marks for every question in Mathematics; all he has to do is to get the right answer in the right way. But in English or History, what is the right answer? How often is a teacher or examiner going to give

ten marks out of ten for an answer in History ? He will always say to himself, "Well, I think so and so ought to have been mentioned." Similarly for the poor answer.....It is a fact then, from differences inherent in the subjects themselves, that in any normal distribution of marks the percentage of candidates obtaining 75 per cent. of the maximum marks in English is less than the percentage obtaining the same marks in Mathematics. This obviously is not fair to the students of English when distinction or scholarships are to be awarded."

(*Secondary School Examination Statistics*, by  
Crofts and Jones.)

The investigation which is the subject-matter of the above reference shows that Mathematics, Foreign Languages and the Sciences form one similar group, while English, History, Geography, Scripture, Art etc., form another group. I am not aware that any scholar in India has ever cared to study the distribution of marks in the various subjects with the object of clearly bringing out the fundamental differences inherent in the subjects or groups of subjects, from the point of view of marking. I feel, however, that the subjects which are offered by our High School candidates should broadly fall into three groups from the point of view of marking. In one would fall the Languages, History and Geography; in the second would fall Mathematics and Science; while in the third would be included the predominantly *practical* subjects, *e.g.*, *Manual Training*, Drawing, Domestic Science, etc. If injustice to candidates is to be avoided it should be the first duty of

the examining body to work out and enunciate a *Principle of Equivalence of Marks* by laying down, particularly at important levels, e.g., the pass level and the first division level, the marks which correspond to particular marks in particular subjects. In other words, the marks awarded by examiners in different subjects cannot, and should not, be accepted at their face value until they have been modified on the basis of two statistical considerations, viz., (a) *Correlations* between different subjects indicating the marks corresponding to certain marks in other subjects, and (b) the *Probable Error* of each mark. It should not be difficult to calculate these two constants, for any person having a knowledge of elementary mathematics can easily learn the method of finding them. (Cf. Appendix I)

35. At the present time all examination results are declared on the basis of 33%, 45%, 60% and 75% of the aggregate marks being prescribed as the minimum levels for a third class, a second class, a first class and a Distinction respectively. How these levels, arbitrarily prescribed as they are in all the subjects and rigidly applied with only minor modifications "here and there, cause unfairness and even injustice to the candidates will be clear from the following five objective studies :

# I

A survey of the marks gained by about a thousand High School Examination candidates for each of the years 1928, 1929 and 1930\* is summarised in the follow-

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\* Cf. *Teaching*, Bombay, December, 1935.

ing table, the statistical figures being expressed in whole numbers :—

Subject			Mean	Standard Deviation
English	...	...	37	10
Mathematics	...	...	47	15
Urdu	...	...	42	10
Hindi	...	...	46	8
History	...	...	39	9
Geography	...	...	42	9
Grand Total	...	...	<u>42</u>	<u>8</u>

This table means that, with an arbitrary 33% prescribed as minimum 'pass' marks in the various subjects and in the aggregate, the average majority (or, the middle 68%) of the candidates appearing at the High School Examination generally secure marks between 47 and 27 in English, 62 and 32 in Mathematics, 52 and 32 in Urdu, 54 and 38 in Hindi, 48 and 30 in History, 51 and 33 in Geography and 50 and 34 in the aggregate. It was remarkable that these figures kept fairly constant from year to year and hence, pending findings to the contrary, may be tentatively accepted as the normal state of affairs in the province.

The conclusion that the average marks are different in different subjects in spite of the prescription of the same 33% as the minimum pass marks should warn us against using this arbitrary standard as an absolute line of demarcation between passes and failures. It should be considered as only an arbitrary starting point and the actual results as 'passes' and 'failures' should be decided on the basis of the achievements of the 'average group,' i.e., in the light of the (Mean  $\pm$  Standard Deviation) figures.

The importance of the figures tabulated above can never be emphasised too much, for a serious question arises here. Are we really justified in adhering to the *same* standard of marks in the various subjects for the purpose of declaring results in the first, second and third divisions and as Distinctions? It is evident that until the policy of "Equivalence of Marks" referred to in para 34 is adopted, marks in different subjects will fail to maintain their correct levels in relation to one another and marking will continue to be lenient in certain subjects (*viz.*, Mathematics) and stiff in the case of others (*viz.*, English).

## II

Another enquiry conducted on the examination marks of the High School Examination of the U. P. Board for the year 1939 points to similar conclusions, *viz.*, the marks in different subjects are not comparable directly without adopting some kind of a principle of the Equivalence of Marks; that there is an unduly large variation in the standards of different examiners; and that some papers and examinations in these papers do not fulfil any useful purpose and are a mere farce or superfluous.

The papers selected in this investigation were the four papers in English, the two papers in Mathematics, and the papers in the Vernacular (Hindi or Urdu). Four random groups of 200 examinees in each group were selected. Each group had been examined, in a particular paper, by the same examiner. The four groups had each a different examiner in the same paper. The investigation was conducted paperwise.

The Mean, the Standard Deviation and the skewness of the groups in each paper were calculated and the results are shown in the following tables :—

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\* Bhatia : A Study of High School Examination Marks of the U. P. Board, I, General. Published in the *U. P. Education*, May and June, 1940.

TABLE I  
(Based on actual marks obtained by the pupils)

Papers	Group I (Total No. 208)			Group II (Total No. 244)			Group III (Total No. 216)			Group IV (Total No. 185)		
	Mean	S.D.	Skew- ness	Mean	S.D.	Skew- ness	Mean	S.D.	Skew- ness	Mean	S.D.	Skew- ness
English I (Max. M. 50)	17.8	5.7	0.00	19.4	5.5	+0.05	18.3	5.7	-0.08	19.7	5.0	-0.12
" II (Max. M. 45)	16.5	4.5	+0.07	15.7	4.7	+0.05	15.4	5.2	-0.40	15.2	5.3	-0.12
" III (Max. M. 40)	15.5	5.7	+0.12	15.2	6.8	0.00	15.7	5.5	-0.25	15.5	5.5	-0.60
" IV (Max. M. 15)	9.5	1.8	+0.33	10.2	1.9	-0.20	9.7	1.9	0.00	9.6	2.1	-0.14
Maths. I (Max. M. 50)	16.0	7.5	+0.50	17.8	6.9	+0.10	19.6	7.6	+0.08	18.7	7.6	+0.40
" II (Max. M. 50)	25.5	8.3	-0.07	24.9	8.2	-0.08	27.8	9.4	-0.20	26.8	8.7	+0.40
Hindi I (Max. M. 50)	20.5	3.3	+0.10	22.3	4.6	-0.08	21.1	4.3	-0.25	17.2	4.5	+0.07
" II (Max. M. 50)	24.9	3.9	-0.50	18.3	6.5	+0.30	20.1	6.2	+0.50	23.2	5.8	...0.10
Urdu I (Max. M. 45)	19.2	3.2	+0.10	19.0	6.7	+0.55	21.5	3.6	0.00	19.0	5.9	+0.45
" II (Max. M. 45)	20.8	3.9	+0.25	21.2	5.2	-0.20	22.2	3.6	-0.10	19.2	4.6	+0.34
" III (Max. M. 10)	6.8	1.9	+0.60	6.8	2.1	+0.45	6.6	1.7	+0.50	6.2	1.9	+1.30

TABLE II  
(Results expressed on a percentage basis)

Papers	Group I		Group II		Group III		Group IV		
	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	
English I	...	35.6	11.4	38.8	11.0	36.6	11.4	39.4	10.0
"    II	...	36.7	10.0	34.9	10.8	34.2	11.6	34.0	11.8
"    III	...	38.8	14.3	38.0	17.0	39.3	13.3	38.8	13.8
"    IV	...	63.3	12.0	68.0	12.7	64.7	12.7	64.0	14.0
Mathematics I	...	32.0	15.0	35.6	13.8	39.2	14.8	37.4	15.2
"    II	...	51.0	16.6	49.8	16.4	55.6	19.8	53.6	17.4
Hindi I	...	41.0	6.6	44.6	9.2	42.2	8.6	34.4	9.0
"    II	...	49.8	7.8	36.6	13.0	40.2	12.4	46.4	11.6
Urdu I	...	42.9	7.1	42.2	14.9	47.8	8.0	42.2	13.1
"    II	...	46.2	8.6	46.9	11.6	49.3	8.0	42.9	10.4
"    III	...	68.0	19.0	68.0	21.0	66.0	17.0	62.0	19.0
									35



An examination of the two tables clearly enables us to come to the following conclusions :—

1. The standard of marking in the different papers and subjects is not at all the same. The means of the first three papers in English are round about 35%, but in English IV it shoots up to about 65%, and, in the different papers in Mathematics, Hindi and Urdu also, the means vary from paper to paper and subject to subject. Again the Standard Deviations from subject to subject (and even from one paper to another in the same subject) show great fluctuations.

Both these factors point to the great variability of the standard of marking in the different subjects in spite of detailed instructions from, and checks of, head examiners.

2. In the case of the *same* paper, different examiners appear to have much too diverse standards. This is seen by examining the S. D.'s in the case of the four groups for a particular paper. Take the case of Hindi II, (S. D's varying from 7'8% to 13'0%) or Urdu II (S. D's, varying from 7'1% to 14'9%), where the variation is extremely high, but in most papers there appears to be sufficient variation to make the standards of marking of different examiners non-equivalent and almost unreliable.

3. English IV and Urdu III appear to be quite unsatisfactory from statistical considerations.

### III

Reference may also be made to another paper (Bhatia : A Study of High School Examination Marks of the U. P. Board—II, English : *U.P. Education*, July 1940) in which the *relative merits* of the different papers as tests of knowledge in that subject were examined and the technique adopted

was that of Thurstone's Multiple Factor Analysis (vide Thurstone : The Vectors of the Mind, 1935; and Thurstone : Primary Mental Abilities).

The four papers in English were taken up for investigation and the examination marks of 458 candidates for the year 1939 were utilized.

The conclusions of Bhatia pointed out that our having *four* papers (and neither more nor less) to test the candidates' knowledge of English is perfectly arbitrary and needs to be re-examined carefully before we can continue assigning four papers to English. His analysis showed that *two* papers appear to serve as useful a purpose as four papers, for the four papers were found to be involving two factors. I quote below the factor-loadings and specifics for each of the four English papers that he found out, and also his conclusions :—

			Loadings		Specifics
Papers			Factor (1)	Factor (2)	
English	I	...	·741	·402	·565
..	II	...	·785	·336	·521
..	III	...	·780	0	·626
..	IV	...	·607	—·107	·787

“On the basis of the assumption that the four present papers test the whole field of the English ability of a pupil, we find that this field is uniquely determined by means

of two 'factors', one of which would appear to be of the nature of 'a general intellective factor applied to the English language' and approximated best by the present second paper; and, the other would appear to be of the nature of a test to examine a pupil's ability in English in relation to set language material. Further, that in the present scheme of papers, the Fourth Paper is the most amenable to local uncertain influences, while if one were to select the one paper, out of the present four papers as the most satisfactory test of a pupil's ability in English, one would unhesitatingly select the present second paper. The present analysis would therefore lead one to suggest the desirability of having two tests instead of the present four in order to examine a pupil's ability in English; the more these two new Tests approximate to the two factors as above discussed, the more satisfactory will the examination be."

#### IV

The following correlations (worked out by my friend Mr. S N. Chakraverty, M Sc, I T., of the Government High School, Cawnpore) also confirm the above observation and can quite reasonably be made the basis for calculating the 'equivalence of marks' in different subjects:—

Subject		Correlation with Grand Total	Correlation with Mathe- matics	Correlation with English
English	...	0.75	0.52	...
Mathematics	...	0.76	...	0.52
History	...	0.65	0.40	0.46
Geography	...	0.71	0.54	0.46
Hindi	...	0.61	0.33	0.47
Urdu	...	0.55	0.25	0.30

Although these figures are only tentative and suggestive they irresistibly point to the need for interpreting examiners' marks in an intelligent manner with the express object of giving each subject its correct 'place value' before the final results are declared. (Also, see para 36 on page 40).

## V

A random calculation of the number of first classes for the years 1928, 1929 and 1930 yields the following figures:—

Year	English	Maths.	Hindi.	Urdu.	History.	Geog.	Aggregate.
1928	14 (1)	145 (37)	23	24 (5)	7	18 (2)	14
1929	9 (1)	205 (37)	9	35 (4)	13	4	18
1930	4	210 (47)	25	7	5	5	12

*Note*—The figures within brackets indicate "Distinctions."

The number of candidates was arbitrarily taken from Roll No. 1 to Roll No. 800 in each case, but the findings are worth serious notice, for the number of first classes and Distinctions in Mathematics is out of all proportion to those in other subjects and in the aggregate. What I suggest is that, in Mathematics, the interpretation of 33% 45%, 60% and 75% marks can never be the same as in other subjects. Here, again, there is need for applying the principle of equivalence of marks to allot each subject to its proper place in relation to other subjects and to the aggregate, especially when awarding first classes and distinctions, which no examining body can afford to make cheap. There is no doubt that these awards are objectionably cheap at the present time.

36. What must be clearly understood is that the examining body has the right arbitrarily or otherwise to prescribe the pass mark (and the minimum marks at the different levels) *but in one subject only*. Once that is done the corresponding marks in other subjects follow as a matter of course from the principle of 'Equivalence of Marks.' As far as I know, this principle was enunciated and illustrated for the first time in India in the *Sankhya* (Indian Journal of Statistics), in its August, 1934, issue by Professors Mahalanobis and Chakraverty. They followed up their analysis of the marks of over 2500 candidates, who took the S.L.C. Examination, U.P. of 1919, by making suggestions for finding the equivalence of marks by statistical methods and gave the following two tables as illustrations:—

*Equivalent Marks in different Subjects.*

English (standard)	30	33	36	40
Mathematics ...	33	37	42	48
Vernacular ...	45	48	51	55
Hist.-Geog. ...	30	33	36	40

*Equivalent Marks in English and Mathematics.*

English	Mathematics (Approx)	Correction
10	2	8
20	17	3
30	33	3
40	48	8
50	64	14
60	81	21
70	96	26

If tables of such equivalent marks are prepared in different subjects for a number of years they will certainly show whether adjustments will not be possible within very

narrow limits of variation and whether it would be worth while making them

37 While at this important question of standardisation of marks it seems necessary to discuss the present system of getting such standardisation done through Head-Examiners' instructions. It is an open question whether these instructions are, or can be, followed in the case of each and every answer-book to be examined by an assistant examiner and whether most of the marking of examiners has not been done so long at the discretion of the examiner himself. It should also be seriously considered whether satisfactory results would not follow if examiners were left to themselves with only a few broad instructions. (Cf. Appendix II)

38. Personally I believe that, after an examiner has been found fit to be appointed as such, he should not be worried too much by rules, regulations and head examiner's instructions. The paper-setter may be required not only to set the paper but also to supply a model solution thereof, with alternative solutions where they are reasonably possible. And, to be on the safe side, he should also be required to mark his own model solution to show his standard of marking. Thus, the Moderating Board will be in a better position to scrutinise the paper and its solution together than at present and to issue instructions for marking each question for the guidance of the examiners. These instructions are to be issued to all the examiners who should now be able to mark the answer-books allotted to them without the need for exchanging marked answer-books with the head-examiner a number of times as at present.

39. I feel, however, that the examining body should supply one more condition to the examiners, viz., the per-

centage of passes expected in the subject and in the paper. It is certainly a fundamental function of an examining body to require that a certain percentage of the candidates should be eliminated due to their being below the required standard, and the pass percentage in any paper or subject can easily be calculated on the basis of the records maintained in the office of the examining body and published in the reports on examinations every year. This requirement may preferably be in the form  $p \pm \nu$  where  $p$  stands for the average pass percentage and  $\nu$  the permissible variation in the case of bright and weak groups of candidates. It will be understood however, that variation beyond the limits of  $p \pm \nu$  being a natural phenomenon, will be allowed provided full explanations are given.

40. It is also very necessary to take serious notice of what may be called vagaries of marking. It has been proved again and again that different examiners award different marks to the same answer and that even the same examiner has been found to allot different marks to the same script if examined at different times. There is nothing surprising in this in view of the natural individual differences which affect such affairs. But what is really surprising is that examining bodies have seldom taken note of the existence of such differences and tried to evolve a sensible system for an intelligent interpretation of examiners' marks, especially when combining them for the purpose of declaring results.

41. It is a common practice in most examinations to award what are called 'grace marks' to candidates who fail by a very narrow margin of marks, provided they earn a prescribed number of marks in the aggregate. This is a

sound principle in its own way, for it accepts, perhaps without knowing it, the need for giving due consideration to the 'Probable Error' of the various marks. But it is doubtful whether examining bodies have been right in applying it only in the case of border-line failures.

42 If these weak and mediocre candidates can receive so much consideration it certainly stands to reason that those who miss the first division or distinction by one or two marks should also get the benefit of the same consideration. It cannot be honestly affirmed that a re-examination of their answer-books would not place them in the upper division, and I am sure that examining bodies do not want to do anything which will retard the 'genius of the race.' Consequently I suggest that the principle of grace marks should be applied to the first division and the distinction levels, too. I consider it as an undesirable reflection on the examination system, rather than on the ability of a candidate, when he is constrained to produce a certificate showing that he missed a first class by one or two marks.

43 It has been found that while a candidate failing by even 5 marks in one subject has got through with the help of grace marks, another failing by one mark in each of three subjects has not been declared successful in spite of his having earned more than the required number of grace marks in the aggregate. In certain examinations like the Intermediate the science and the agriculture candidates are required to pass separately in theoretical and practical portions of science subjects and sometimes more than one science subject have been combined to form one composite subject. In such examinations it often happens that a



candidate passes quite well in the aggregate of that subject (and in the whole examination) but cannot be declared as a pass for having failed by one mark in a part of the subject. I may also quote a remarkable case of a High School candidate who secured first class marks in four subjects, obtaining distinction marks in English but who could not be declared a pass because he failed in Mathematics by 6 marks and hence could not get the benefit of grace marks which could not be awarded beyond the prescribed maximum limit of 5.

These illustrations have been quoted to show that a strict and mechanical application of rules in such cases is sure to cause real hardship, if not positive injustice, to the candidates. The situation calls for either the framing of detailed rules covering as many cases as can be visualised, or, what is better, giving of a wide discretion to the authority empowered to declare the final result.

44. In connection with this question of grace marks as a necessary corollary to the theory of 'compulsory' and 'optional' subjects the following extracts from the Report of the Calcutta University Commission (Vol. II, Ch. XVII) will be found quite suggestive :—

"It is clear that a candidate might pass who knew either no algebra or no geometry; and we have come across cases of schools in which algebra is either not taught, or seriously neglected, because it is regarded as unnecessary for the examination. Even supposing that one knew that a candidate had passed in arithmetic and geometry it would be very difficult, without having dealings with a large number of successful candidates, to guess

the probable attainments of a person who had 'passed' the matriculation in these subjects. It is only by the experience gained by contact with a large number of such students that one gets an inkling of the kind of guarantee that the University offers.....(para 50.)

"For good or for evil, an examination at the secondary, and even at the higher secondary, stage is often used not so much to ensure that each candidate shall acquire a knowledge of each subject that shall be of real use, as to ensure that the subject shall not be neglected, and that those candidates to whom it is congenial or useful shall have a fair opportunity of studying it; and the curriculum is apt to be rather over-weighted in certain cases on this account. In such cases a pupil may consciously or unconsciously have to choose between special excellence in one or more subjects for which he is particularly gifted and a fair average of attainment all round which will ensure his passing in all subjects. We think that at the matriculation (or, as we prefer to call it, the 'high school examination') stage it would be wise to allow a board of examiners, or of representatives of examiners in all subjects, to apply at their discretion and within definite limits the principle of compensation and to allow special excellence in one branch of study to compensate for some degree of failure in another.....(para 80.)

"We think that excellence in an intermediate examination as a whole might quite reasonably be

allowed to compensate for deficiency in a non-essential subject; but that it might be a cruel leniency to allow such compensation in the case of an essential subject, involving the student in future waste of time and money.....In any case, we feel, in pursuance of this principle, that grace marks to the extent of 5 per cent. should not be allowed in subjects which are compulsory... A candidate marked 5 per cent. below a minimum cannot be regarded as a 'border-line' case. He is clearly below any reasonable border-line. Possibly, at all examinations examiners might be instructed to mark 'border-line candidates' with a special symbol so that these cases might be individually considered in the light of their aggregate marks, or of special excellence in another subject. (Para 81.)

45 It is neither possible nor desirable to discuss all the details of the process of examination ; they should better be left to evolve under intelligent scrutiny and study. What is very desirable, however, is that a scientific outlook should pervade the whole scheme of examination. The present system has become extremely mechanical and worn-out and examining bodies do not seem inclined to introduce the methods of statistics or the findings of technical researches from advanced countries into their hide-bound schemes. In the foregoing pages some of the glaring faults and flaws have been indicated and suggestions given for revising and improving the present system at a number of vital points. I believe that judgments on candidates, if based on the principle of equivalence of marks and if passed after giving elastic and human consideration to numerical marks at important levels, will be more sound and will do a greater amount of justice to the candidates than at the present time.

## APPENDIX I

(From *Marks of Examiners*, by Hartog and Rhodes,  
Memorandum by Cyril Burt, para 603)

(1) *Quantitative methods* of investigation are already available for studying the accuracy of marking in examinations of a scholastic or academic type: these methods will indicate how closely the marks of a given examiner or board of examiners are approximating to the hypothetical true marks and how far each is influenced by irrelevant factors of various types.

(2) Under certain specifiable assumptions, which can be approximately verified in actual practice, the methods of *factor analysis*, worked out for researches upon the validity of mental and scholastic tests, may, with slight modifications, be applied to the investigation of examination results. The simplest assumption is that the marks of any given examiner may be resolved into two hypothetical components—(i) the true value of the work to be marked, a component influencing all examiners but in different degrees, and (ii) residual errors, a component independent of the first and peculiar to each examiner. The difficulties that embarrass the investigation of mental factors for the most part do not arise in investigating examination results. In particular, by adopting a broader mathematical basis (treating the variables as co-ordinates in hyperspace) it can be shown that the seemingly divergent formulae hitherto put forward are in their essential nature merely variants or alternative simplifications of one general conception.

(3) It appears that the simpler and speedier methods give *reasonable approximations* to a true result. With the rough data at present furnished by examination marks the more elaborate methods would be out of place. Such methods are in the main of theoretical interest, enabling us to justify, and occasionally to correct, the results secured by the more rapid short cuts.

(4) The degree to which an examiner's marks agree with those of his colleague or colleagues may readily be measured by a *coefficient of correlation*, which can be calculated (if a simple and approximate formula be used) in a few minutes.

(5) The discrepancies between the marks awarded for the same scripts by different examiners may be due, not only to imperfections in their powers or modes of judgment, but also to differences of scale, *i.e.*, to individual differences in the general standard of severity and in the degree to which the marks are spaced out; these differences can be measured, and if necessary allowed for, by calculating *averages and standard deviations*.

(6) In theory the accuracy of a given examiner may best be measured by calculating a *general factor coefficient*, that is by estimating the degree to which his marking correlates with the hypothetical true value taken as a standard. When the intercorrelations have been calculated, such coefficients can be determined at once by means of a simple formula.

(7) Where the correlations between the several examiners and the true marks are not likely to differ widely, the *unweighted average* of the marks allotted by all the examiners yields a fair and quicker estimate of the ideal or true mark.

(8) From the examiner's correlation with the true mark may at once be derived a *coefficient of non-relation* which measures the relative amount of random variation characterizing his mark; i.e., the degree to which he has failed in eliminating the influence of sheer chance.

(9) Where the correlations between the several examiners and the true marks differ widely, *the marking of the best examiner* is almost as accurate as the average marking of the whole Board, and may even be more accurate. Accordingly, in certain types of examination, it may prove easier to increase the accuracy of the marking by trying to increase the accuracy of one or two examiners than by increasing their number and then averaging the results. Multiplying the number of examiners is of greatest value when their correlation with the true mark is high and their correlation with each other is low.

## APPENDIX II

### A DISCUSSION ON HEAD EXAMINER'S INSTRUCTIONS

(From the *Report of the Calcutta University Commission*,  
1917—19, Vol. II, Ch. XVII, paras 66—76)

69. A question in a recent intermediate examination on the history of Greece and Rome ran as follows :—

“Indicate the characteristic differences between the constitutions of Athens and Sparta.”

The instructions to examiners read thus :—

“1. Athens democratic, Sparta oligarchic. 2. Athens progressive, Sparta conservative 3. Difference in the machinery of Government; e.g., king and ephors in Sparta, etc. 4. Athens commercial and intellectual : Sparta military. Any *three* points : 4 marks each.”

Now the intelligent student would suppose that this question meant what it said, and that he was expected to describe and compare the system of government of the two cities. But if he did so with the utmost clarity and fulness he would only have covered two of the four points which the examiners were instructed to look for and would only get 8 out of 12 marks. Another student who dealt however briefly with the vague generalities of points 1, 2 and 4, (the last of which, at any rate, seems entirely irrelevant to the question) and said nothing at all about the systems of government, would get full marks! The good student is penalised;

the student who has learnt brief notes by heart without understanding his object is rewarded.

67. Also at a recent intermediate examination the following was one of the questions set in English history:—

“To what extent did Henry II and Edward I contribute towards the development of the administrative and judicial machinery of England?”

This is a very hard question to set to young students, who cannot fairly be expected to understand the working of mediæval ‘administrative and judicial machinery.’ Still they would deserve credit if they knew that Henry II was the real inventor of the jury system for a number of different purposes, that he strengthened the machinery of the shire-courts, that he brought the sheriffs under the control of the king’s central court, and sent justices round the country to make this control more effective. And they might perhaps also be expected to know that Edward I did his best to strengthen the king’s courts against those of the feudal barons, that he greatly improved the police system; and that his reign saw the real establishment of parliament. But this is not the kind of knowledge expected. Here are the instructions to examiners for marking the question:—

*Henry II—*

1. Constitutions of Clarendon.
2. Assize of Clarendon.
3. Assize of Northampton.
4. Grand Assize.
5. Assize of Arms and Soutage.

}  $1\frac{1}{2}$  marks each;  
any four.



*Edward I—*

- |  |   |                              |
|--|---|------------------------------|
| 1. Statute of Westminster I                  | } | 2 marks each ;<br>any three. |
| 2. Statute of Gloucester.                    |   |                              |
| 3. Statute of Mortmain and church relations. |   |                              |
| 4. Statute of Westminster II.                |   |                              |
| 5. Statute of Winchester.                    |   |                              |
| 6. Statute of Westminster III.               |   |                              |
| 7. Model Parliament.                         |   |                              |

There is no indication as to the degree of comprehension of the aim and contents of these measures which the candidate must show before being awarded his  $1\frac{1}{2}$  or 2 marks. Manifestly he could not be expected to know the contents of some of Edward I's very miscellaneous statutes. It seems fair to assume that a mere mention of the names of these enactments would suffice, and that if they were not named no credit would be given. Observe the result. A candidate can get full marks on Henry II without mentioning any of the things which we have enumerated as really important in his reign. On the other hand, he might give the most admirable description of these things, showing that he really understood in a general way (and that is all that can be expected from an intermediate student) the significance of the reign, and not get a single mark. He might get full marks for Edward I by setting down "Statute of Westminster I, Statute of Westminster II, Statute of Westminster III," and never mentioning Parliament! In other words, the instructions given were so devised as to encourage the memorising of absolutely useless, because unexplained, facts and actually to discourage an intelligent treatment of the question asked. We do not hesitate to say that the candidate who gave the kind of answer rendered possible, or

even suggested, by these instructions would, in a better type of examination, receive no credit at all; and that the kind of answer which ought to be encouraged might, under these instructions, receive no marks at all.

68. The origin and the justification of a system of this kind in the eyes of those who work it, can only be that when as many as 20 or 30 assistant examiners are employed for the correction of one set of answers it is the only way of ensuring 'equal treatment' by different examiners. The argument may seem plausible, though there is ground for doubting whether even that 'equality of treatment' is secured. But is not the equality in any case purely illusory? Is it not attained by marking for mere memory and neglecting everything else, so that it is not the answers as a whole that are marked equally, but those portions of them for which a minimum of intelligence is required? Is it not evident that in this system of marking we have one of the main causes for the dictation of 'complete notes', the use of 'keys', and the sterilisation of teaching in Bengal, to the ruin of so many promising intelligences?

69. Fortunately, we have evidence that all Boards of Examiners do not blindly follow this system; nor does the same Board always follow it in the same rigid fashion.

70. We quote from a recent set of the rules for examiners for the matriculation English, second paper. The candidates were required to give in simple English the substance of certain passages in prose and verse and the direction to examiners was to—

“read the whole answer, marking, as you proceed, the grammatical, orthographical and other errors.

Examine how far the leading ideas are brought out, and then value the answer as a first, second or third class performance. Marks : 1st class, from 15 to 20; 2nd class, from 8 to 14; 3rd class, from 1 to 3."

71. Another example may be quoted in the rules drawn up for the examination of the first half of the third pass paper in English for the B.A. which read as follows :—

- "1. Each answer should be judged and marked as a whole for matter and composition.
2. The substance or purport and the aim or underlying thought should be judged as a whole. If the latter is not separately given but sufficiently brought out in the course of the answer such treatment should be accepted.
3. Mere paraphrase should not be accepted as a full or adequate answer.
4. No marks should be given for answers which entirely miss the meaning and purpose of the passage.
5. If one or two relevant points are merely brought out in an answer which as a whole is wide of the mark, nominal marks should be given."

72. We also print in our appendix volume the 'General Rules' for the logic examination forming part of the Intermediate examination in arts in 1917, from which we extract the following :—

- "(1) Each answer is to be considered as a whole as well as part by part; and, in assigning marks, the

impression produced by the whole answer should specially be taken into account.

- (3) The part values are to be treated as movable so that excellence in one part may be taken as compensating for deficiencies in another.
- (6) Before putting down the total value for an answer, we should consider whether the answer as a whole is worthy of pass value and before putting down the aggregate value of a paper as a whole we should consider whether as a whole it is fit to pass. Any increase or decrease of the aggregate value as a result of discretion should be noted on the cover."

73. If such directions as those just quoted had been carried into effect in every subject there would probably have been less outcry from the critics. Yet even the most excellent rubric, without a right tradition behind it, and above all the sense of responsibility which the University owes to the public, will avail little.

74. The whole theory of 'marking' is a difficult and abstruse subject which, as Dr. Brajendranath Seal points out, has not yet been sufficiently investigated, and it is only by further experiment and investigation that the practice can be improved. We believe, however, that the plan recommended in the directions quoted in paragraph 70, *viz.*, that of dividing answers, according to the Oxford system, into 3 or 4 classes, and of then assigning numerical marks, is more likely to give concordant values with different examiners than the process of first assigning marks, ranging, say, from 1 to 20, and of then assigning a class to the 'answer according to the numerical mark assigned. The assignment of

marks in the first instance tempts the examiner into the system just condemned, of searching for the various component parts of an answer and assigning to each part marks and fractions of marks. The sum of such marks in the majority of cases, does not represent the resultant impression on the mind of the examiner, which is the ultimate criterion of its 'value.' Not infrequently a candidate, though he may make a correct statement in one part of an answer, may make another in a second part which proves conclusively that he did not understand what he was writing about in making the first statement; the value of his answer as a whole is zero; but under the present system he gets marks for it. Sir Gooroo Dass Banerjee, in his valuable book on the *Education Problem in India*, makes the ingenious suggestion that marks should first be assigned to each answer on the analytic method, *i.e.*, by the summation of the marks allotted for its component parts; and then by the synthetic method, *i.e.*, on consideration of the question as a whole; and that the mean of the two should finally be awarded. But unless negative marks are awarded for want of comprehension, the system would not yield satisfactory results.

75. Various correspondents have suggested that special excellence in an answer should receive due recognition, which is impossible under the mechanical system.<sup>1</sup> This contingency

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<sup>1</sup> By the mechanical system we understand our witnesses to mean a system in which in its strictest form no discretion is left to the judgment of the examiner. Under such a system the answer expected to each separate part of a paper is defined beforehand as nearly as possible, and definite marks allotted to it; so that no margin is left for any 'special excellence' which could not be foreseen and which by its nature must be left to individual judgment to appraise.

is contemplated in the logic regulations quoted in paragraph 72 above; and the suggestion may be conveniently carried out, either by providing a margin of marks unallotted to special questions, for 'general impression,' or by making the sum of the marks for the questions treated separately exceed the maximum allowed for the paper<sup>1</sup> as a whole.

76. Conversely, Mr. Ramesh Chandra Majumdar, Assistant Professor in History in the University, suggests that the—

“negative marking system should be introduced to discourage cramming, *i.e.*, if any gross mistake is committed in answer to one question not only would no credit be given to that, but some marks would be deducted from the total. This would bring home to every student the risk of depending upon notes alone without having a general and accurate knowledge of the subject.”

This further contingency is also provided for by the Logic regulations quoted in paragraph 72 above.

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<sup>1</sup> Thus, if the paper consist of 10 questions of equal value of which 5 are to be answered and the maximum for the paper is 100 marks, each question might be allotted 25 marks. This procedure, which is sometimes adopted, implies that though a student is permitted to reply to five questions, he may obtain full marks by answering only four with distinguished excellence; and the rubric at the head of the paper should state this explicitly. The chances of a student getting over 100 marks per cent. on a paper marked on this scheme are so small as to be negligible. If he were in that happy position, his marks could be reduced to 100 without injustice.